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Liver Therapy in the Treatment of Pernicious Anaemia

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PERNICIOUS anaemia is a generalized disease characterized by a macrocytic anaemia in which the ratio of the amount of haemoglobin to the number of red blood cells is greater than normal, although both values are reduced. Other manifestations of the disease are: abnormalities of the alimentary tract such as sore tongue and achlorhydria, and lesions of the central nervous system. The first report of a case of pernicious anaemia was published by Combe of Edinburgh in 1882. The classical description by Addison of this type of anaemia, which so often bears his name, was given in 1855. No appreciable progress was made in the treatment of pernicious anaemia during three-quarters of a century.

In September, 1920, Whipple, Hooper and Robscheit published a series of four papers (1) dealing with the influence of diet upon blood regeneration in simple anaemia. Of various foods which were tested liver was the most effective in causing rapid regeneration of haemoglobin. In the Harvey Society Lecture delivered on January 7, 1922, Whipple (2) suggested that the feeding of liver might be useful in the treatment of pernicious anaemia.

Gibson and Howard (3) appear to have been the first to utilize this information in clinical work. They reported in 1923 a series of eleven cases of pernicious anaemia treated satisfactorily with a diet containing liver. Nine years later these authors (4) gave a history of three of the cases for the intervening period.

Further reports by Whipple and his associates in 1925 (5) again demonstrated the value of liver in the regeneration of haemoglobin and, subsequently, Minot and Murphy began the intensive investigation of liver therapy. They

described in 1926 (6) beneficial results secured in 45 cases to whom had been given a diet rich in liver for eight months. At that time, however, Minot and Murphy attributed the results, not to liver itself, but to the use of a diet high in complete proteins and low in fat.

By July, 1927, Minot and Murphy were convinced that the effectiveness of their diet was due to the liver which it contained. Proceeding on the assumption that the liver contained an anti-anaemia substance, simple extracts were prepared and found to be active. In 1928 they (7) stated that the anaemia of pernicious anaemia appeared to be primarily dependent upon the failure of the primitive cells in the bone marrow to differentiate toward mature erythocytes. The bone marrow is stimulated by an active substance contained in liver.

Preparation of Liver Extract

In the preparation and fractionation of liver extracts Cohn collaborated with Minot and Murphy. In a joint publication (8), July, 1927, a simple system of fractionation was employed which yielded two active fractions, D and G. Improvements in procedure were described in 1928 (9).

A procedure based largely on the work of Cohn, Minot and Murphy was employed in 1928 when large-scale preparation of liver extract was begun in the Connaught Laboratories. For some months extract was distributed in solution in eight-ounce bottles. Obvious problems of sterility caused a change to a more convenient form and since 1929 extract in the form of powder has been distributed. For six years a standard procedure which is known to produce an active extract has been followed. The following is a general outline of the method: Fresh beef liver is minced and extracted with acidified water. The extract is concentrated and purified to yield a powder which is distributed for oral use. Average yields during a period of three years have given two per cent of the initial weight of liver in final powder form. This does not mean that one pound of powder contains the activity of fifty pounds of fresh liver. There is appreciable loss during preparation and the final product contains 50-60 per cent of the active substance contained in the original liver.

Oral Administration of Liver Extract

Liver extract powder has been extensively used in the treatment of pernicious anaemia for some years. Its value has been amply proved clinically. However, this mode of treatment is expensive and requires the full co-operation of the patient. The chief advantage is that the patient is spared the taking of large volumes of liver or liver broth. It should be emphasized that the administration of liver extract of any type can give only those results which would be secured from ingestion of fresh liver. The use of liver extract may be advisable for several reasons; the patient may find the taking of liver or liver broth unpleasant, or the physician may consider it advisable to use a concentrated source of the anti-anaemia principle.

Development of Intramuscular Administration

In 1930 Gänsslen (10) reported successful treatment of 40 cases of pernicious anaemia by parenteral administration of a highly active liver extract. Unfortunately no details were furnished, nor have yet been given, as to the mode of preparation. A year later Castle and Taylor (11) discussed the intravenous use of a crude solution of Cohn's fraction G. This contained depressor substances, and intravenous administration caused untoward effects. Consequently, Strauss, Taylor and Castle (12) suggested the use of a similar solution by intramuscular injection.

Preparation of solution for intramuscular injection was begun in these Laboratories in 1931 by the procedure employed by Strauss, Taylor and Castle (12). Clinical trials during a period of over a year showed that this form of therapy was advantageous and general distribution of the solution was undertaken in 1933. At first, solutions were such that one cubic centimetre contained extract derived from five grams of fresh liver. Results secured by Farquharson in the Toronto General Hospital indicated that solutions having double this concentration were advantageous and solutions containing in one cubic centimetre extract from ten grams of fresh liver were made available for distribution. More recently Farquharson (13) found that treatment of cases with lesions of the spinal cord was more effective when a solution containing extract from twenty grams of liver per cubic centimetre was used. Solutions of this strength are now distributed as well as the less concentrated type.

Advantages of Liver Therapy by Intramuscular Injection

Extensive clinical trials have shown that the treatment of pernicious anaemia by intramuscular injection of liver extract has several advantages. Injections are generally painless and without untoward reactions. Nausea is not produced nor augmented as may be the case after oral treatment. Prompt responses are secured. One other aspect of intramuscular administration is worth emphasis. It is probably the most economical method of treating pernicious anaemia. A given weight of liver extract is at least thirty times as active given parenterally as when administered by mouth.

Solutions for intramuscular use prepared by the above procedure contain depressor substances, probably histamine and choline. These solutions are free from protein and attempts to sensitize guinea-pigs with them have been unsuccessful. As a precautionary measure each lot is tested on two species of animals before being issued for human use. Injections in rabbits and mice are made and the animals observed for seven days to ensure lack of toxicity.

Experience in the Toronto General Hospital has shown that, in a large series of cases treated intramuscularly with liver extract, practically all have tolerated the extract well. After the first few injections the patients have had little local discomfort. Occasionally there has been a mild febrile reaction with slight malaise twenty-four hours after an injection has been given. In three cases out of approximately three hundred a generalized urticarial eruption with some prostration has appeared within an hour or two after the injection.

These three patients were desensitized by frequent injections of small doses of extract, the amounts being gradually increased. Within a few weeks it was again possible to give dosage of ordinary size without untoward effect.

The Role of the Stomach in Pernicious Anaemia

In 1928 Castle (14) formulated an hypothesis which has had a profound effect on considerations of the aetiology of pernicious anaemia. A characteristic symptom of this disease is gastric achylia. The stomach is primarily designed for peptic digestion of protein and Castle postulated that persons suffering from pernicious anaemia were unable to digest proteins so as to liberate a substance which is necessary for the formation of the red blood cells. Acting on this assumption Castle had normal individuals eat minced beef muscle, itself not haemopoietic. After 45 minutes the stomach contents were removed and fed to pernicious anaemia patients. A definite reticulocyte response, similar to that observed after administration of liver, was observed. Similar results were obtained when beef muscle was incubated with normal gastric juice. The production of a haemopoietic substance from beef muscle was held to be due to the action of a thermolabile, enzyme-like substance in gastric juice.

In explanation of these results Castle postulated two factors: (a) an intrinsic factor; (b) an extrinsic factor. The intrinsic factor is secreted by active normal gastric mucosa, and is not present in detectable amounts in the gastro-intestinal tract of patients having pernicious anaemia.

Prompted by the hypothesis advanced by Castle, Sturgis and Isaacs in 1929 (15) used hog stomach tissue in treating cases of pernicious anaemia. The tissue was simply minced and dried, or defatted with petroleum ether and dried. Satisfactory results were obtained, comparable to those experienced after the oral administration of liver or liver extract. Subsequently preparations of stomach tissue have been distributed under several trade-names. It has generally been believed that these stomach preparations owe their activity to the presence of both factors described by Castle.

Several attempts have been made to increase the amount of active substance extractable from liver. In one case liver has been incubated with stomach tissue and claims have been made that a crude product could be obtained having three to four times the activity of the original liver. It is curious that when patients are given this preparation a reticulocyte response is obtained but the red blood cell count rises slowly and the haemoglobin remains low. It was suggested that iron should be given concurrently. A communication by Conner (16) states that this type of preparation shows no increase in potency, as was originally claimed.

Herron and McEllroy (17) have described a method for prolonged autolysis of liver. The crude filtrate was said to be highly active and the procedure has been patented. It seems impossible to carry the increased potency through any purification procedure, even the simple one ordinarily used for liver extract. Several clinical reports have failed to substantiate the claims made regarding the presence of the increased potency.

Methods of Assay

At present little is known regarding the chemistry of the active substance in liver and this has been largely due to the lack of a convenient method of assay. At present only one completely certain procedure is available, the testing of fractions on human cases of pernicious anaemia. Available cases, suitable for test purposes, are so few in number that it would be possible to carry out in a week purification studies for which the testing would occupy months. Moreover, the number of cases for experimental work is further restricted since attention must first be given to the assay of routine extracts. Every lot of extract prepared by these laboratories for intramuscular use has been assayed prior to issue. On account of this difficulty, a number of attempts have been made to devise a method of assay on animals but practically all of them have been found to be of little use.

Therapeutic Results

Numerous reports from almost every country in the world have appeared in which are discussed the clinical uses and the results secured with various liver and stomach preparations. Since most of these are in agreement and since space is limited only a few will be mentioned. Best, MacLean and McHenry (18) reported on the oral use of liver extract in the treatment of pernicious anaemia and summarized results secured in 43 patients. The extract employed was prepared by the method outlined earlier in this paper and the testing of various lots showed that each was potent. For this type of treatment it was found advisable to use for an initial period the contents of three vials of powder per day (i.e., the extract from 675 grams of liver). No further therapeutic measures, other than the use of hydrochloric acid in a few cases, were adopted. The reticulocyte response was obtained within ten days and generally about the sixth day after treatment was begun. After a definite improvement in the blood picture and in the general condition of the patient had been secured it was possible to reduce the dosage to the contents of two vials, and in some cases, one vial, per day. It was shown that the use of liver extract powder gave all the effects obtained by the use of fresh liver provided that adequate amounts were administered.

Results secured by intramuscular administration of liver extract were discussed by McHenry, Mills and Farquharson (19). Liver extract prepared by the procedure outlined earlier in this paper was used in the clinics of the Montreal General Hospital and of the Toronto General Hospital. Intramuscular treatment was found to be safe, dependable, and effective provided adequate amounts were given. Administered intramuscularly, a given quantity of extract was much more potent (at least thirty times) than was the same amount when given by mouth. The intramuscular administration of extract from 10 to 20 grams of liver was fully as effective as the ingestion of extract from 250 to 800 grams of liver. A good reticulocyte response was obtained from a single injection of the extract from 50 grams of liver.

Intramuscular liver therapy was found to be of great value in the treat-

ment of patients in severe relapse to whom large doses could readily be given by this method with assurance of an early response. Remissions began more promptly than when extract is administered by mouth. Intramuscular therapy is also very useful in treating patients who refuse to continue to take sufficient amounts of liver or liver preparations by mouth. The intramuscular administration of the extract from 100 grams of liver per week in one or two doses is probably sufficient to maintain most patients with pernicious anaemia in a good state of health. However, it is extremely important, as in any other type of therapy of pernicious anaemia, to maintain the patient in good health with no anaemia, and to prevent the appearance of progression of nervous lesions.

In a recent paper Farquharson (13) has discussed the treatment of pernicious anaemia with particular reference to spinal cord involvement. Results obtained at the Toronto General Hospital show definitely that progress of the degenerative lesion of the spinal cord can be completely arrested in all patients provided that adequate amounts of liver or liver extract are given with the patients remaining in bed. Farquharson reported that marked improvement, no matter how severe the lesion, occurred in those whose symptoms and signs were of short duration. Many patients having had neurological disability for one to two years improved definitely. However, most of those whose lesions were of long duration and great severity remained permanent invalids.

Farquharson has emphasized that it is of utmost importance to ensure adequate therapy and states that "adequate liver therapy in the treatment of pernicious anaemia consists in the administration of that amount of active principle necessary to relieve all the manifestations of the disease". It is simple to determine the amount necessary to treat the anaemia but the amount required to relieve the nerve lesions cannot be ascertained so simply. For patients suffering from pernicious anaemia with definite subacute combined degeneration of the spinal cord, Farquharson recommends that the amount of active principle given be at least 50 per cent more than would be necessary to treat the anaemia. In some cases two or three times as much active material may be necessary. As a general rule patients suffering from cord lesions should be given the extract from 200 grams of liver per week if intramuscular therapy is employed.

In summarizing a discussion on liver therapy of pernicious anaemia it should be emphasized that no harmful effects have been shown to result from overdosage and that it is better to give too much rather than too little. The following may be regarded as safe recommendations for maintenance dosage, any one of which should preserve a patient in good condition, provided that therapy is continued without interruption:—

1. The daily ingestion of one-half pound of cooked liver. Or:
2. The daily ingestion of the broth or extract from one pound of liver. Or:
3. The intramuscular administration of the extract derived from 100 grams of liver once each week, or once in two weeks.

In the initial period of treatment it is advisable to give fifty per cent more

than the maintenance dose and to continue this until definite improvement has been obtained. In cases showing nervous involvement at least twice as much as the ordinary maintenance dose should be given. Therapy must be continued throughout the life of the pernicious anaemia patient and every care should be taken to prevent any relapse or any manifestation of the disease.

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Recent Trends in Mortality from Pernicious Anaemia

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TEN years ago Minot and Murphy established the efficacy of liver therapy in the treatment of pernicious anaemia. It is therefore opportune to review recent trends in recorded mortality from this disease. As a natural outcome of the introduction of an efficient treatment, there has been a wider clinical interest in the anaemias with considerable improvement in the accuracy of diagnosis. The extent to which these and other factors may have influenced the recorded mortality cannot be determined, but they should be kept in mind.

Volume of Anaemia Mortality in Ontario

During the quarter century 1909-1933, 447 deaths per year on the average were attributed to anaemia in Ontario. This is a significant volume of mortality, not perhaps generally recognized; and by far the greater part of it, latterly 90 per cent, is specifically ascribed to pernicious anaemia in official records (table I). In 1933 there were 386 deaths credited to anaemia, a number in excess of the combined mortality from typhoid fever, diphtheria, scarlet fever, measles, and whooping cough, and just slightly less than the total deaths from appendicitis. The toll of diabetes from 1927 to 1933 was considerably greater than that of anaemia, but for the years 1921 to 1926 the recorded mortality from anaemia and even that from pernicious anaemia alone actually exceeded that from diabetes mellitus.

Secular Trends in Mortality from Pernicious Anaemia in Ontario

Information on recorded mortality from pernicious anaemia is available only from 1921 when for the first time it was separately designated as a subdivision of the group "Anaemia, chlorosis," in the International List of Causes of Death. Since, however, a relatively stable proportion of the deaths in this group are contributed by deaths certified to pernicious anaemia, the history of pernicious anaemia mortality prior to 1921 may, perhaps not unreasonably, be inferred from the records of total anaemia mortality (1).

Table I presents the recorded deaths and death rates from anaemia from 1909 to 1934. For the years before 1921 the deaths and death rates for pernicious and "other anaemias" given in the table were estimated by applying the proportions obtaining in 1921-1925, viz., 84 and 16 per cent, to the total anaemia deaths in the records for those years.

From 1909 to 1926 the recorded mortality from anaemia per 100,000 population remained fairly constant, while that from pernicious anaemia showed, if anything, a very slight tendency to increase. The data of table I also suggest that the high mortality from pernicious anaemia in Ontario (table II) is not of recent origin. Furthermore, it is probable that pernicious anaemia has been an important cause of death in this province, causing 1.2 to 1.4 per cent of all deaths, at least as far back as 1909.

TABLE I

DEATHS AND CRUDE DEATH RATES FROM ANAEMIA† Ontario, 1909-1934

Year	Pernicious Anaemia*		Other Anaemias		Total Anaemias	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1909	326	13.3	62	2.5	388	15.8
1910	274	11.0	53	2.1	327	13.1
1911	366	14.5	69	2.7	435	17.2
1912	378	14.7	72	2.8	450	17.5
1913	394	15.1	75	2.9	469	18.0
1914	382	14.4	74	2.8	456	17.2
1915	406	15.1	77	2.9	483	18.0
1916	448	16.4	86	3.1	534	19.6
1917	401	14.5	76	2.7	477	17.2
1918	432	15.4	82	2.9	514	18.3
1919	356	12.5	67	2.3	423	14.8
1920	429	14.8	82	2.8	511	17.7
1921	405	13.8	106	3.6	511	17.4
1922	437	14.6	90	3.0	527	17.7
1923	454	15.1	69	2.3	523	17.4
1924	433	14.2	81	2.6	514	16.8
1925	476	15.3	79	2.5	555	17.8
1926	504	15.9	56	1.8	560	17.7
1927	338	10.5	45	1.4	383	11.9
1928	307	9.4	34	1.0	341	10.4
1929	310	9.3	34	1.0	344	10.3
1930	329	9.7	33	1.0	362	10.7
1931	313	9.1	48	1.4	361	10.5
1932	312	9.0	36	1.0	348	10.0
1933	343	9.7	43	1.2	386	11.0
1934	268	7.5	43	1.2	311	8.7

*1909-1920 figures estimated by taking 84 per cent of total anaemia deaths.
†Rates per 100,000 population.

In 1927 the trend in mortality changed abruptly and there was a decline to a markedly lower level. This is also true of deaths classed to anaemia of other than pernicious type. The decline in recorded mortality from pernicious anaemia in 1927 and 1928 to a significantly lower level (4) in the face of increasing interest in the disease and better diagnosis is strongly suggestive objective evidence that some treatment factor was responsible. The decline is strikingly abrupt, amounting in 1927 to a reduction in recorded pernicious anaemia deaths of 34 per cent for Ontario as a whole, and of 48 per cent for the city of Toronto (2).

It seems not unreasonable to attribute this reduction to liver therapy

which came into general use in 1927, but if such is the case, how is one to account for the decline in "Other anaemias" which occurred about the same time? It may be that prior to 1927 some of the deaths certified to this latter group may have been deaths from pernicious anaemia which were not qualified as such. Moreover, in many instances deaths classed to other anaemias are cases in which the anaemia was secondary to other primary disease which is not specified on the medical certificate and with the increasing tendency to state multiple causes, a transfer of such deaths to other groups could occur quite rapidly for this reason alone (3). For these reasons, it is conceivable that the decline in the group "Other anaemias" may be quite unreal.

In considering these data it may be urged that actually no one dies of anaemias of the non-specific type such as are included under the heading "Other anaemias." However, while the influence of improved certification or changes in fashion of certification alone could account for a decline in "Other anaemias," any improvement in accuracy of diagnosis within the anaemia group would tend to increase the number of deaths debited to pernicious anaemia rather than to decrease it. Practically every item in the International List of Causes of Death is preferred to those anaemias listed as "Other anaemias" and if the physician indicates the origin of the anaemia, viz., malignant disease, etc., the death is classed to such primary morbid states. Furthermore, the size of the group of "Other anaemias" is relatively small, too small to invalidate in any significant measure the observed trends in pernicious anaemia mortality.

Trends in Mortality in Other Countries

It is of interest that the recorded rate of mortality from pernicious anaemia in Ontario even at the present time is greater than it was in England and Wales before 1926 (table II and figure I). The Ontario rates are respectively more

TABLE II

CRUDE MORTALITY FROM PERNICIOUS ANAEMIA*
Certain Countries, 1921-1934

Year	England and Wales	United States†	Canada‡	Ontario
1921....	6.5	4.9	9.0	13.8
1922....	6.8	5.5	9.9	14.6
1923....	6.2	5.3	10.0	15.1
1924....	6.5	5.5	10.3	14.2
1925....	6.6	5.9	10.4	15.3
1926....	7.1	5.8	11.2	15.9
1927....	6.8	4.3	7.7	10.5
1928....	4.7	3.3	6.7	9.4
1929....	4.9	3.2	6.6	9.3
1930....	5.4	3.4	7.1	9.7
1931....	5.6	3.2	6.4	9.1
1932....	6.4	3.3	6.6	9.0
1933....	6.0	3.0	6.9	9.7
1934....	5.9	2.8	5.2	7.5

*Rates per 100,000 population.
†Registration States of 1920.
‡Registration Area of 1921.

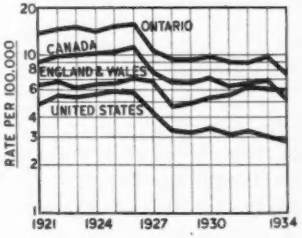

FIGURE I.

MORTALITY FROM PERNICIOUS ANAEMIA IN CERTAIN COUNTRIES, 1921-1934.

than twice those in the United States throughout the whole period. Furthermore, in no country for which mortality statistics are available has the death rate from pernicious anaemia ever been as high as that in Ontario. Despite the marked differences in mortality, however, the trend in each of the instances given is remarkably similar. The same is true of the data for Australia, New Zealand, Scotland, Union of South Africa, Norway, Holland, and other countries.

The decline in mortality from pernicious anaemia which occurred in 1927 is striking, and the tendency of the recorded mortality to remain at this new level since that time, significantly lower (4) than the earlier one, is distinctly noteworthy. The new low point reached in Ontario in 1934—7.5 per 100,000 population—is actually less than half of that in 1926.

Some Features of the Differential Mortality in Ontario

(a) *Sex*—Recorded mortality from pernicious anaemia shows a definite excess among females. This excess has also been observed elsewhere—in England and Wales, Australia, and in the United States. Table III gives the standardized mortality rates from pernicious anaemia in Ontario by sex from 1921 to 1934, the Ontario population at the 1921 census being used as standard.

TABLE III

STANDARDIZED PERNICIOUS ANAEMIA DEATH RATES*
Ontario, 1921-1934

Year	Males	Females	Persons
1921....	12.6	15.1	13.8
1922....	12.6	16.6	14.5
1923....	13.2	16.6	14.9
1924....	12.9	14.9	13.9
1925....	14.0	15.6	14.8
1926....	14.4	16.0	15.3
1927....	9.4	10.6	10.0
1928....	8.5	9.2	8.8
1929....	8.8	8.4	8.6
1930....	7.6	10.1	8.9
1931....	7.7	8.7	8.2
1932....	6.6	9.6	8.1
1933....	8.6	9.0	8.8
1934....	6.5	7.0	6.8
1921–25 Average.	13.0	15.8	14.4

*Standardized on the population of Ontario, 1921, rates per 100,000 population.

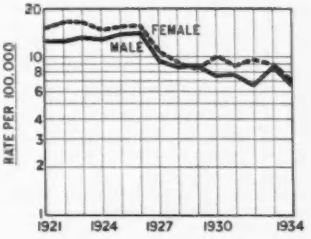

FIGURE II.

MORTALITY FROM PERNICIOUS ANAEMIA BY SEX, Ontario, 1921-1934. Rates per 100,000 Populaton (Standardized).

The female death rate has exceeded the male rate for each year but one during the 14-year period, and both sexes have participated about equally in the abrupt decline in 1927-1928 (figure II). This excess mortality among females in Ontario is regularly present in all age groups to age 70. The percentage excess of female over male mortality is greatest during the age period

20-49 years, at which period, however, the death rates are quite low since almost 90 per cent of the deaths from pernicious anaemia now occur among persons 50 years of age and over.

(b) *Age*—Pernicious anaemia is characteristically a disease of middle or late life and this fact is reflected in the recorded mortality data. The specific death rates are highest at ages 70 and over, and those for each 10-year age group below this point are markedly lower.

The data presented above have indicated that there was a significant decline in mortality from pernicious anaemia in 1927-1928, and a study of age specific mortality rates shows that the age groups 30-49 and 50-69 years are those particularly responsible for this decline (table IV). In the age group 70 years and over there has been little change.

TABLE IV

MORTALITY FROM PERNICIOUS ANAEMIA AT AGES*
Ontario, 1921-1934

Year	0–29		30–49		50–69		70 and over†	
	Rate	%	Rate	%	Rate	%	Rate	%
1921	0.7	3.0	10.1	19.8	51.7	53.3	93.6	23.8
1922	0.4	1.6	9.9	18.3	57.5	56.6	97.4	23.5
1923	1.0	3.7	9.6	17.4	56.5	54.5	103.9	24.5
1924	0.7	2.7	7.6	15.0	56.0	57.7	96.8	24.6
1925	0.8	3.2	8.2	14.7	55.6	54.0	119.4	28.1
1926	0.5[1]	1.8	7.1	12.6	64.9	60.8	109.9	24.8
1927	0.5[1]	3.1	4.9	13.3	38.7	55.7	81.1	28.0
1928	0.6	3.9	4.6	13.9	31.0	50.2	80.7	32.0
1929	0.4[1]	2.8	3.4	11.1	29.3	48.6	93.0	37.6
1930	0.2[1]	1.2	3.7	11.2	31.2	50.4	96.0	37.3
1931	0.3[1]	2.5	2.3	7.1	29.9	51.9	91.9	38.6
1932	0.1[1]	0.8	2.9	8.8	26.5	47.1	98.7	43.3
1933	0.4[1]	2.7	3.8	11.2	29.8	48.3	96.2	37.8
1934	0.1[1]	1.0	2.1	7.6	20.5	43.9	92.0	47.5
1921–25	0.7	2.9	9.1	17.0	55.5	55.2	102.6	24.9
1930–34	0.2	1.7	3.0	9.3	27.6	48.5	95.0	40.5

*Rates per 100,000 population at ages.
†Age not stated included.
[1] Rates based on fewer than 10 deaths.

In 1934 the mortality in the age group 30-49 years was approximately 77 per cent below the average of 1921-25 and in the age group 50-69 years about 63 per cent. These data also suggest that, other things being equal, the force producing the reduction in mortality has been more effective at ages under 70 years, and they again emphasize the reduction in mortality from pernicious anaemia which has occurred since 1926, a reduction which has been particularly pronounced at ages between 20 and 69 years. At ages 40-79 years, however, pernicious anaemia still forms a significant part of the total mortality, 1.35 per cent of deaths at these ages being ascribed to it in the records during the 5 years 1930-1934.

Since the decline in mortality from pernicious anaemia during the last 8 years has not been comparable at all ages, there must have been a change in the

age distribution of the deaths. Whereas, during the period 1921-1925, 58 per cent of the recorded deaths from pernicious anaemia were among persons 60 years of age and over, now over 73 per cent occur at these ages. Table IV also gives the percentage distribution of recorded pernicious anaemia deaths by age for each year from 1921 to 1934, and for two five-year periods 1921-25 and 1930-34. These data have been corrected for changes in the age and sex distribution of the population by standardization using the population of Ontario at the 1921 census as standard.

The proportion of the recorded deaths at all ages under 70 years has markedly declined and beyond that it has increased (figure III). In other words, not only are there now fewer deaths from pernicious anaemia, but a greater proportion of these deaths occur at older ages. Since there is no reason to suppose that a corresponding change in the incidence of pernicious anaemia among the population has occurred, this phenomenon "may probably be best explained by the prolongation of life of those afflicted with this disease, particularly at younger ages" (5). The data in table IV show too that though the reduction in total recorded pernicious anaemia mortality began abruptly in 1927, it had actually begun much earlier among persons under 50 years of age, both the specific mortality rates and the proportion of deaths at these ages showing a decline as early as 1924. This fact is worthy of note.

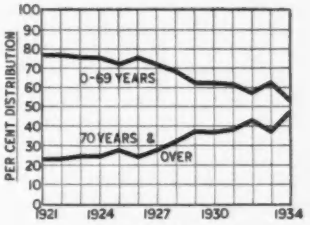

FIGURE III.

DEATHS FROM PERNICIOUS ANAEMIA, Ontario, 1921-1934, per cent distribution by age (standardized).

A summary of the trends in mortality from pernicious anaemia by age and by sex during the period for which we have recorded data is given in table V.

TABLE V

MORTALITY FROM PERNICIOUS ANAEMIA BY SEX AND BY AGE*
Per cent of Average Rates for 1921-1925. Ontario, 1921-1934

Year	Age				Males	Females	Total
	0–29	30–49	50–69	70 and over			
1921.....	100	111	93	91	97	96	96
1922.....	58[1]	108	104	95	97	105	101
1923.....	133	105	102	102	101	105	103
1924.....	92	85	101	95	99	94	96
1925.....	117	89	100	116	107	99	103
1926.....	67[1]	78	116	106	111	101	106
1927.....	75[1]	54	70	78	72	67	69
1928.....	83	50	56	79	65	58	61
1929.....	58[1]	39	53	90	68	53	60
1930.....	25[1]	40	56	92	58	64	62
1931.....	50[1]	24	54	89	59	55	57
1932.....	17[1]	29	48	98	51	61	56
1933.....	58[1]	40	54	93	66	57	61
1934.....	17[1]	21	37	94	50	45	47

*Standardized on Ontario population, 1921.
[1] Based on fewer than 10 deaths.

The rates of mortality for individual years from 1921 to 1934 in table V are expressed as percentages of the rates for the period 1921-1925, the rates having been standardized using the population of Ontario 1921 as standard. Thus in 1934 the male and female rates were only 50 per cent and 45 per cent respectively of this average. Among persons at ages 30-49 years, the rate in 1934 was only 21 per cent of the average for 1921-1925, at 50-69 years 37 per cent, while at ages 70 and over the rate remained practically the same, being 94 per cent of the average of 1921-1925 (figure IV).

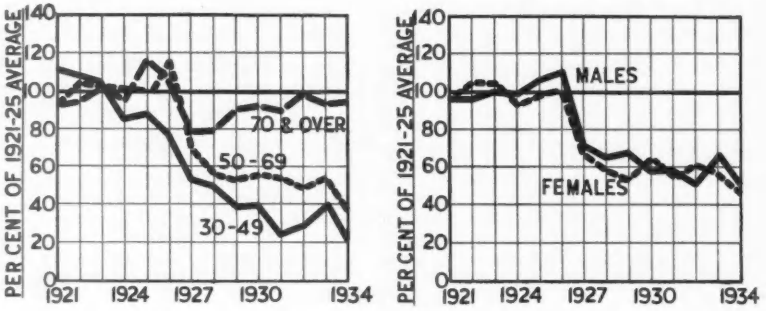

FIGURE IV.
PERNICIOUS ANAEMIA, Ontario, 1921-1934.
Age and Sex Specific Mortality, per cent of 1921-25 average.

Seasonal Variations in Mortality

Stevenson (6) in 1925 observed a definite seasonal variation in mortality from pernicious anaemia in England and Wales, the death rate being lowest in the third quarter and highest in winter months in both sexes. In table VI the quarterly distribution of mortality from pernicious anaemia by sex in Ontario is expressed as a percentage of that for the whole year. The data are corrected for variation in number of days per quarter in each instance.

TABLE VI

SEASONAL DISTRIBUTION OF MORTALITY*
Pernicious Anaemia, Ontario

Quarter	1921–22 and 1925–26			1928–32		
	Males	Females	Total	Males	Females	Total
First	24.2	23.5	23.8	27.5	27.3	27.3
Second	31.2	29.8	30.5	25.7	27.8	26.8
Third	24.8	25.2	25.0	25.2	23.0	24.0
Fourth	19.8	21.5	20.8	21.7	21.8	21.8

*The average number of deaths per day in each quarter is expressed as a percentage of average deaths per day for each period.

These data show that for the earlier period there was a definite excess mortality in the second quarter year and a low level in the last quarter. In the

later period this seasonal variation has become less striking, the change being characterized by a spreading of the peak of mortality over the first and second quarters. A low incidence in the last quarter is common throughout.

Local Variations in Mortality

Standardized mortality rates from pernicious anaemia for London, England, have been shown to be markedly lower than the general rates, and also lower than those for other urban districts, county boroughs and rural districts, for both sexes (7) (8). Such comparisons of urban and rural mortality in Canada can, however, only be made with considerable reservation until Canadian mortality records are compiled on a de jure basis. It is reasonable to assume, however, that any error introduced by de facto compilations would be toward apparent urban excess. With this in mind, the crude mortality rates for urban (cities and towns of 5,000 and over) and rural areas (remainder) were computed. No consistent differences were found during the period 1921-1934 except that the decline, which occurred abruptly in 1927, was much more marked in urban than rural areas, being 40 per cent in the former and 20 per cent in the latter of the 1921-25 average. By 1929, however, the rural rate had reached a level comparable with that in urban areas.

For the years 1921-24 and 1931-34, when population estimates for local areas may be regarded as reasonably accurate, specific mortality rates from pernicious anaemia have been calculated and are given in table VII.

TABLE VII

MORTALITY RATES FOR RURAL AREAS AND CERTAIN URBAN GROUPS†
Ontario

Year	Large Cities*	Other cities of 10,000 and over	Towns of 5,000–10,000	Rural	Total
1921.....	12.5	12.6	18.3	14.3	13.8
1922.....	14.0	17.1	17.6	14.3	14.6
1923.....	15.9	17.4	14.0	14.2	15.1
1924.....	14.1	13.7	20.0	13.8	14.2
1931.....	8.3	9.8	11.3	9.2	9.1
1932.....	6.4	9.7	13.9	9.8	9.0
1933.....	8.9	10.6	13.7	9.6	9.7
1934.....	6.5	8.6	10.2	7.6	7.5

*Toronto, Hamilton, Ottawa, London, and Windsor.
†Rates per 100,000 population.

In consideration of the fact that the rates in urban groups are in all probability overstated, the rate for large cities is comparatively low. In contrast the mortality for smaller urban areas, particularly that for towns of 5,000 to 10,000 population, is in excess of the total rate. How much of this apparent excess is due to the inclusion of non-resident deaths is not known.

When standardized on the Ontario population of 1921 as standard, the rate for the four large cities (Toronto, Hamilton, Ottawa and Windsor) for 1930-32 is 8.1; for the remaining parts 8.6; and for the province as a whole 8.4 per 100,000.

Interprovincial Variations in Mortality

The recorded mortality from pernicious anaemia in Ontario has always been persistently in excess of that in all other provinces. Throughout the period 1921-1934 the Ontario rate has been approximately twice that in Manitoba, Alberta, British Columbia, Quebec, New Brunswick, and Nova Scotia, and three times that in Saskatchewan. These differences cannot be due to differences in statistical treatment since compilation for all the provinces has been done in a central office since 1921 (Quebec only from 1926 on) and they can be accounted for only by an actual difference in incidence or by variation in diagnostic acuity or certifying practice of physicians.

The high position of Ontario in mortality from pernicious anaemia has long been known and attention has been drawn to this fact earlier in this communication. It was emphasized in 1927 by Cornell (9) in a review of that date. This fact is one of fundamental interest and importance and its explanation is as yet unknown. The variations by provinces are of a high order but since the number of deaths per year from this cause is so small in seven of the provinces, the variation from year to year in each is in some measure to be expected. To eliminate this factor to some extent, the data have been grouped to show the mortality in the Maritime and Western provinces in comparison with that in Ontario (table VIII).

TABLE VIII

CRUDE MORTALITY RATES FROM PERNICIOUS ANAEMIA*
Certain Areas of Canada, 1921-1933

Year	Maritime Provinces	Ontario	Western Provinces	Total†
1921.....	5.9	13.8	4.7	9.0
1922.....	6.7	14.6	5.6	9.9
1923.....	6.2	15.1	5.5	10.0
1924.....	8.0	14.2	6.6	10.3
1925.....	7.7	15.3	5.6	10.4
1926.....	7.0	15.9	7.1	11.2
1927.....	6.0	10.5	5.1	7.7
1928.....	5.1	9.4	4.1	6.7
1929.....	6.3	9.3	4.0	6.6
1930.....	5.9	9.7	4.4	7.1
1931.....	5.6	9.1	3.6	6.4
1932.....	6.0	9.0	4.0	6.6
1933.....	5.6	9.7	4.1	6.9

*Per 100,000 population.
†Registration Area of 1921 (excluding Quebec).

In this form all three trends show a break in 1927-1928 to a new level which has in general been maintained. How much of the actual differences in mortality in the Maritimes and Western provinces represents a true deficit below that in Ontario is not known. In the Western provinces the population is of a much younger age structure than Ontario. On the other hand, the Maritime population is very much older. When the Ontario rate for 1931-32 is standardized using the Ontario census population of 1921 as standard, it

becomes 8.4 instead of 9.3 and that for Alberta and Saskatchewan jointly for the same period becomes 5.0 instead of 3.6 per 100,000, using the same population as standard. Age difference alone, therefore, accounts for about one-third of the apparent difference in this instance.

DISCUSSION

This study of the data on recorded mortality from pernicious anaemia in Ontario indicates that there has been a marked reduction in specific death rates since 1926, particularly at younger ages. This reduction in mortality is significant and gratifying, but still about 50 per cent of the deaths from pernicious anaemia occur in persons under 70 years of age. Furthermore, the volume of mortality represented by the anaemias, as reflected by recorded deaths, is still large, amounting to 311 deaths in 1934, 89 per cent or 268 of which were classed to pernicious anaemia. The continued improvements being made in clinical treatment and the wider application of specific therapy perhaps through special clinics, lead one to believe that during the next decade mortality statistics may reflect a still further reduction in deaths from pernicious anaemia, particularly at ages under 70 years.

SUMMARY

1. A statistical study of the trends in mortality from pernicious anaemia in Ontario since 1921 is presented and the essential features in differential mortality discussed.

2. The recorded mortality from pernicious anaemia in Ontario is higher now and has always been higher than in any other state, country, or province for which data are available.

3. Approximately 90 per cent of the recorded anaemia deaths are classed to pernicious anaemia.

4. The specific standardized rate of mortality from pernicious anaemia remained practically unchanged until 1927, the average for 1921-26 being 14.5 per 100,000. In 1927 an abrupt decline occurred amounting to 34 per cent and the death rate has tended to remain at this lower level until 1934 when a new low rate of 6.8 was recorded, or less than half of that in the period prior to liver therapy.

5. The specific mortality among females has definitely exceeded that among males for every year but one during the last 14 years. The excess is present at all ages up to 70 years but is most marked during the childbearing period. The two sexes have participated about equally in the decline in the specific death rate.

6. The highest death rates are found at ages 70 and over and the reduction in mortality has been limited to a decline in death rates at ages under 70 years, the reduction being greatest in the younger age groups. As a result the age distribution of the deaths from pernicious anaemia since 1926 has markedly changed, the proportion at 70 years and over in 1934 being twice that in 1921.

7. In 1934 the male and female rates were only 50 per cent and 45 per cent respectively of the average for 1921-1925. Among persons at ages 30-49 years the rate in 1934 was only 21 per cent of the average for 1921-1925, at 50-69 years 37 per cent, while at ages 70 and over the rate remained practically the same, being 94 per cent of the average of 1921-1925.

8. A definite seasonal fluctuation in pernicious anaemia mortality is demonstrated with excess in the first half-year and low rates in the last quarter.

9. Certain local variations in mortality are noted, which with certain stated reservations suggest relatively low rates in the large cities and relatively high rates in towns of 5,000-10,000 population.

10. A striking difference between the specific mortality from pernicious anaemia in Ontario and that in other provinces of Canada is recorded. About one-third of the apparent difference in the Western areas would seem to be explained solely by differences in the age constitution of the populations at risk.

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Multiple Specimens for Central Laboratory Diagnosis of Enteric Infections*

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SUCCESSFUL control of enteric infection is, in many respects, peculiarly dependent upon close co-operation between the medical profession and the laboratory. Particularly is this co-operation essential to that very important element of such control, the early recognition of the incipient infection. If the physician collects and transmits the proper specimens from his suspected case, and if the laboratory receives these specimens in good condition, the probability of a satisfactory early diagnosis is of a high order.

It will be agreed, perhaps, that the proper specimens to be submitted by the physician, as soon as he suspects the existence of an enteric infection, are the following:

1. Blood for agglutination tests (Widal), 5 cc.
2. Blood for culture, 10-20 cc.
3. Faeces.
4. Urine, 10-20 cc.

There is a possibility that one or all of these specimens may furnish evidence of the type of the infection which may be present.

On the other hand, the physician must have due regard for the condition and convenience of his patient. He must consider also his own convenience. He cannot well be burdened with a multiplicity of bulky outfits, the equipment which he carries probably comprises only the usual bare necessities, and his time is limited. It is therefore not to be expected that the physician will submit from every case to the laboratory, particularly to the central or branch public health laboratory located in some distant city, all the specimens enumerated. Instead, a choice must be made of those specimens, and in those quantities, which may conveniently and practicably be collected and transmitted.

Central laboratories, in their endeavour to anticipate the choice of the physician, have designed various types of diagnostic outfits for this purpose. A very common practice is the provision, for diagnosis, of a separate outfit for each of the four specimens mentioned. Some central laboratories, however, in order to assist the physician to collect readily the several specimens desired, have distributed combination outfits, providing facilities in a single container

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for the collection of more than one type of specimen. The Provincial Department of Health of Ontario (1), for example, distributes a combined outfit for blood culture and for blood for the agglutination test. Combined faeces and urine outfits are supplied by many laboratories. The success which attended the introduction of these combined outfits induced the Laboratory of the Quebec Provincial Bureau of Health to extend the combinational feature one step further.

A new outfit was designed which included three vials of about 8 cc. capacity in one mailing case. One of these, empty, was intended for blood for the agglutination test; the second, containing glycerine and saline, for faeces; and the third, also containing glycerine and saline, for blood for culture (diagnosis) or for urine (detection of carrier). Distribution of the former "tin plate" outfit for the sending of dried blood for the Widal test was discontinued.

With the introduction of this new outfit an effort was made to familiarize physicians with its use and to emphasize the value of submitting the three specimens desired.

SPECIMENS RECEIVED

The change in practice described was effected in the spring of 1931. Table I shows the remarkable increase in the number of enteric specimens examined by the laboratory in that and in the ensuing fiscal years. These figures represent specimens received both for diagnosis and for the detection of carriers.

TABLE I

ENTERIC DISEASE SPECIMENS RECEIVED BY THE LABORATORIES OF THE QUEBEC PROVINCIAL BUREAU OF HEALTH IN THE FISCAL YEARS (JULY-JUNE) 1931 TO 1935

	1931	1932	1933	1934	1935
Blood (for Widal)	1147	1431	1328	1452	1314
Blood for culture	22	250	356	556	601
Faeces	401	853	1451	1942	2388
Urine	166	475	875	1182	1135

It will be observed that although the number of Widal tests has not varied greatly during the four years 1931-1935, the number of blood samples for culture has increased from 22 to 601, the faeces samples from 401 to 2,388, and the urine samples from 166 to 1,135. Evidently the physicians have not been slow to recognize the advantages of submitting the several specimens suggested. Another result was a marked increase in the number of liquid blood samples, replacing the unsatisfactory samples of dried blood, received for the agglutination test. At present about 50 per cent of such specimens are of liquid blood.

RESULTS OBTAINED FROM MULTIPLE SPECIMENS

During the first ten months of the calendar year of 1935 a total of 1,480 blood samples was submitted to the laboratory for agglutination tests. Of these, 986 (67 per cent) were accompanied by some other type of specimen.

Table II shows the results of examination for evidence of typhoid or paratyphoid infection in these 986 multiple specimens.

TABLE II

EXAMINATION OF MULTIPLE SPECIMENS FROM CASES OF SUSPECTED TYPHOID OR PARATYPHOID FEVERS, JANUARY-OCTOBER, 1935

Combination of specimens received	Number of outfits received	Positive results obtained*									All Negative
		W	F	U	B	WF	WB	FB	WFU	WFB	
WF	69	14	4			19					32
WFU	377	143	9	1		58			4		165
WFB	256	56	14		1	33	12	1		5	135
WB	268	79			3		12				174
WBU	5	1									4
WU	11	6									5

*W = Widal only positive. F = faeces only positive. B = blood culture only positive. U = urine only positive. WF = Widal and faeces positive, etc. (Specimens were usually 12-24 hours in transit.)

It will be noted that in 377 cases faeces and urine specimens, and in 256 cases faeces and blood culture, accompanied the Widal specimen. Altogether, about 43 per cent of all Widal specimens were accompanied by two other types of specimen, and 24 per cent by one other type. (The remaining 33 per cent, constituting Widal tests alone is, of course, not included in table II.) It is evident that multiple specimens will be submitted by physicians if the means provided them for so doing are simple and convenient.

Particular interest is attached to the results in the second and third groups, each of which consisted of three different specimens. The second group of 377, the specimens including Widal, faeces, and urine, yielded 143 positive Widals with the other two specimens negative, 9 isolations of the organism from faeces, 1 from the urine, 58 from faeces together with positive Widal tests, and 4 from both faeces and urine together with positive Widal tests. In other words, from this group of 377 combinations the organism was isolated 10 times when the Widal test was negative and 62 times when it was positive, a total of 72 times. Only 5 times was it isolated from urine.

The third group permits comparison of results from the combination Widal specimen, faeces, and blood for culture. From the 256 of these combinations received, the organism was isolated 16 times when the Widal specimen was negative and 50 times when it was positive. In 19 cases it was isolated from the blood.

Without further discussion of the details of table II, the outstanding features of the results, features which are of particular significance, are these:

1. Of 986 cases where the Widal was accompanied by some other specimen, the Widal test was positive in 442 (45 per cent).

2. In 176 cases (18 per cent) the organism was isolated.

3. In 33 cases (3.3 per cent), although the Widal test was negative, the organism was isolated.

4. Frequency of isolation of the organism was 40 per cent of the frequency of positive agglutination.

Certain additional items of interest derived from the data of this table are given in table III.

TABLE III

CERTAIN RELATIONS DERIVED FROM TABLE II

Faeces positive when Widal negative	28 cases
Faeces positive when Widal positive	119 of 344 cases
Blood culture positive when Widal negative	5 cases
Blood culture positive when Widal positive	29 of 198 cases
Urine positive when Widal negative	1 case
Urine positive when Widal positive	4 of 212 cases
Organism recovered	186 times
When Widal negative, organism was recovered from	33 cases
When Widal positive, organism was recovered from	143 of 442 cases
Organism recovered from	176 cases

The most important practical result of the use of this combination outfit has been that in 176 of these 986 cases, multiple specimens enabled the laboratory, upon examination of the first specimens submitted by the physician, to report to him the isolation of the organism very probably responsible for the illness of his patient.

These figures amply demonstrate the value of multiple specimens. Table IV, which indicates the relative frequencies with which the various specimens yielded positive results, shows that faeces samples were chiefly responsible for the success attained. Faeces samples yielded the organism in 147 cases; blood, in 34 cases; and urine, in only 5 cases.

TABLE IV

FREQUENCY OF POSITIVE RESULTS FROM MULTIPLE SPECIMENS
TYPHOID AND PARATYPHOID, JAN.-OCT., 1935

	Number received	Widal+	Faeces+	Urine+	Blood culture+	Negative
1. Faeces	69	33	23	..	..	32
2. Faeces and urine	377	205	71	5	..	165
3. Faeces;and blood culture	256	106	53	..	19	135
4. Blood culture	268	91	..	..	15	174
5. Blood culture and urine	5	1	..	..	..	4
6. Urine	11	6	..	..	..	5
Totals	986	442	147	5	34	515

This comparison may be taken to confirm the contention often expressed that the organism is present in the faeces quite early in the course of many enteric infections. It must be borne in mind, however, that many victims of

enteric disease, particularly those in rural districts, do not call in a physician until forced to do so by the severity of the illness. This means that the first specimens submitted to the laboratory by the physician are frequently collected in the later stages of the disease when the chances of recovery of the organism from the faeces are particularly favourable. This fact is of special interest in connection with the choice of specimens to be collected. Indeed, we consider that whatever the choice of specimens for the central laboratory may be, they should include at least the blood for agglutination (tube specimen) and faeces. These specimens offer, in our opinion, the greatest probability of yielding evidence of infection.

We must, on the other hand, admit that our figures do not fairly indicate the possibilities of the blood culture (or urine) specimen. The facilities provided in our outfit for collection and transmission of blood for culture or urine (dictated by considerations of economy when this outfit was designed) should be improved. A larger tube for the purpose and substitution of a culture medium for the glycerine and saline now employed would probably result in a considerably greater proportion of isolations than that indicated in table IV. Suitable changes are under consideration.

Too much must not be expected from a blood culture, however. The over-all dimensions of the outfit must be kept reasonably small if the physician is to have it available at all times. And the physician's equipment as well as his consideration for his patient will probably limit the total amount of blood collected, for both agglutination test and blood culture, to about 10 cc. Furthermore, the organisms, if in the blood at the time of collection, are frequently present in very small numbers, particularly during the more advanced stages of the disease when, as frequently happens, the physician is first called to attend the case. Nevertheless, we believe that the outfit may be so improved with respect to facilities for collecting blood culture (or urine) specimens that we may be able to increase the frequency of recovery of organisms from routine multiple specimens to 50 per cent or more of the frequency of positive agglutination tests obtained from these specimens, instead of the 40 per cent now obtained.

There is no doubt that the physicians of the province are rapidly coming to appreciate the utility of the multiple specimens. From the public health standpoint the early and the comparatively sure diagnosis permitted by this type of specimen is of inestimable value. The advantages to be derived particularly from the triple specimen, Widal, faeces, and blood culture, in central laboratory diagnosis of enteric infection well warrant the effort to provide facilities for the simultaneous collection and transmission of such specimens.

CONCLUSIONS

The experience of the Division of Laboratories of the Quebec Provincial Bureau of Health, in the examination of multiple specimens submitted for

central laboratory diagnosis of enteric infection, has demonstrated the utility of such specimens.

In 986 cases from which blood for agglutination tests together with some other type of specimen was submitted, the laboratory was able, upon examination, to report isolation of the organism probably responsible for the disease in 176 cases. The ratio of the frequency of recovery of the organism to the frequency of detection of agglutinins in these 986 cases was 40 per cent.

When convenient means of collection and transmission of multiple specimens have been provided by the central laboratory, the physician usually has welcomed the opportunity to submit such specimens. Of 1,480 blood specimens submitted to the laboratory for the agglutination test, 986 (67 per cent) were accompanied by some other type of specimen; 43 per cent were accompanied by two other specimens.

The experience recorded indicates that the most satisfactory combination of routine multiple specimens for diagnosis is that which includes blood for agglutination tests, faeces, and blood for culture. The faeces sample is of particular value as a supplementary initial specimen in diagnosis of enteric infection by the central laboratory.

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Planning a Generalized Public Health Nursing Program

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THE town of St. Marys is situated on the Thames River in Ontario. The town, which is only 200 acres smaller in area than the neighbouring city of Stratford, is very hilly and divides itself naturally into four districts: the west, north, south, and east wards. The population is about 4,000 of mixed racial origins: English, Irish and Scotch. There is a school in each of three wards—north, south, and west, the largest being in the south ward. Public health nursing has been continuous in St. Marys for more than twelve years, the present incumbent being the fifth nurse to carry on the service. Using St. Marys as a typical Ontario town, an outline of the steps taken to organize public health nursing in a community is presented.

It is necessary for the nurse first to meet representative people in the community. She of course reports to the medical officer of health, with whom frequent conferences are held. As the opportunity permits, the nurse should meet physicians and dentists, school teachers, members of the board of health and town council, and the leaders of the voluntary organizations, particularly the Women's Institute, the Home and School Club, the local chapter of the Imperial Order of the Daughters of the Empire, and the welfare agencies. The local clergy, the editor of the local newspaper, and other members of the community should be visited. It is helpful if the nurse is notified when the public school inspector and the representatives of the Children's Aid Society and the Mothers' Allowance Commission are in town.

In considering the important activities in a generalized public health nursing program, the services rendered to mothers in maternity, to infants, preschool children and school children, and to adults will be discussed.

MATERNITY SERVICE

At the beginning of each month the physicians are visited to enquire if they have prenatal cases for which they wish nursing supervision. The mother is visited and advised regarding the importance of regular visits to the family physician. It is suggested that the mother make arrangements to have the services of a graduate nurse or, if the expense is too great, a home nurse. If the mother does not know of a nurse, a suitable nurse is suggested and she is asked to consult her physician in regard to her plans. If the mother cannot afford a nurse, hospitalization is suggested. If she will not go to a hospital, it falls to the lot of the generalized public health nurse to be at the confinement. (In such a case the physician calls the nurse.)

If a home nurse is to care for the mother and baby, she is seen by the nurse and instructions are given regarding the articles necessary and the way to use them at the time of confinement. After the confinement instructions are given in the bathing of the baby and the mother. The importance of visiting the physician within the first six weeks for an examination to see that all is well is emphasized.

INFANCY SERVICE

The infancy service falls under two headings: the child health conference and home-visiting of well and sick babies. The conference is held each Thursday afternoon from 1.30 p.m. to 5 p.m. in the nurse's office in the town hall. The babies are undressed by their mothers in an adjoining room, weighed by the nurse in her office, and sent back to the dressing room. The nurse discusses individual problems with each mother and there is a talk with the group on such topics as the baby's clothing, the benefits of sunlight and method of exposure, habit training, and diet. No change is ever made in a baby's feeding except on the advice of the physician. The weight of the child, its age in months, and the feeding formula are recorded. The doctor is telephoned and asked if he would advise any change in the child's diet. If a new formula is given it is written in the physician's order book. An index card with the formula of the feeding is given to the mother. The card has on it the physician's name and the nurse's initials.

As a handbook for the mothers, supplementing this information, the Diet-Series, 1 to 5,* is used. It is a splendid guide and is authorized for use by the Provincial Department of Health. Milk for under-nourished children is supplied by a fund provided by our local chapter of the I.O.D.E. Money from this fund is also used to purchase cod liver oil for prenatal cases and for infants and preschool and school children whose parents are unable to procure it.

Home Visits

In the home visit to a well baby the nurse endeavours to give the same teaching as at the conference. If a baby is being inadequately fed, the family physician is notified and the same plan followed as at the conference. In the first visit to a new baby the nurse stresses the importance of birth registration and the necessity of sending the registration form to the municipal office as soon as possible. In the case of a sick child the parents are asked to call the family physician or to give the nurse permission to do so. If the physician's orders are such that a demonstration regarding the treatment is necessary, the mother is taught how to give the treatment.

As babies advance in age to eight or nine months, the mothers are advised regarding the importance of immunization against diphtheria and vaccination against smallpox. It is explained to the mothers that, as long as their babies are being breast-fed, the infants have a degree of immunity against certain diseases, but when the baby is weaned it requires to be immunized.

In the case of a child with a defect or suspected defect, the nurse advises

**Published by the Canadian Welfare Council, Ottawa.*

the parents to consult the family physician. If a child requires treatments for which the parents are unable to pay, the nurse asks one of the service clubs to consider assisting.

SERVICE TO PRESCHOOL CHILDREN

Medical supervision of every preschool child is urged. Mothers are instructed in child hygiene and in the daily routine of a child's life. The control of communicable diseases is aided by watching for early symptoms and explaining immunization. When physical defects have been revealed by the medical examination, the nurse assists in obtaining correction of the defects.

SERVICE TO SCHOOL CHILDREN

Care of the school child claims a large proportion of the time of the public health nurse. Every morning from 9 to 11 the nurse is at a school. From 11 to 12 she makes home visits to see children who are absent from school through illness or to discuss with parents certain defects existing in their children.

At the beginning of the school year records and directory sheets to correspond with these records are made out. In September a quick class-room inspection is made of all the children and every pupil is weighed and measured. In October thorough class-room inspections are made and the pupils in the primer and junior fourth grades are examined by the medical officer of health.

In November a diphtheria toxoid clinic is held. The physicians of the town serve in turn and receive an honorarium. Cards are sent to the parents in all cases where there is no record of the child's having had treatment. The nurse also obtains the names of all preschool children and sends cards to their parents. This card, signed by the parent, requests the nurse to have toxoid administered to the child. The Public School Board of Education finances the toxoid clinic for school-age children and the local Home and School Club provides funds for the preschool-age children. The large auditorium of the Central School serves as the clinic room. The pupils of all the public schools receive treatment there.

In January a quick class-room inspection is made followed by a dental inspection. The local dentists examine the children without remuneration. It must be admitted that the apparatus is crude. Again the Central School auditorium serves as the room, the pupils of all the schools coming to it for examination. On the platform of the auditorium are placed four chairs to serve as dentists' tables. On each is placed a paper towel. These makeshift tables being in position, four little benches are placed on the floor of the auditorium just in front of the platform. (The light is good in this part of the room.) On top of each bench is placed an ordinary high-backed chair. Thus there are four high, although not adjustable, chairs. A towel is fastened to the back of each chair as a head-rest and a paper towel is pinned to this. Thus is contrived the "dentist's chair".

The dentist's assistant records the findings of the examination. Behind each dentist is placed a group of about twelve chairs. Confusion is avoided

by having an entire class-room examined by the same dentist. The child has been told beforehand that his class is being examined by Dr. A., and when the pupil's turn comes, he takes his seat in Dr. A.'s row.

After the dental examination cards are sent to the parents. A white card is used for the report of the condition of the child's teeth. This card, signed by the parent, gives the clinic dentist permission to care for the teeth. If the white card is returned unsigned, a blue card is forwarded to the parent. The blue card is to be signed by a parent who is having his child's dental work done by a family dentist and not at the clinic. The blue card, signed by the dentist when the child's work is completed, is returned to the teacher. The end of February finds our dental records completed.

Most gratifying results of dental clinic work were found in one of our first-book classes of 1936. When it was a primer class in 1935, this group had been examined and dental care given.

PRIMER CLASS, 1935		FIRST BOOK (SAME) CLASS, 1936	
Deciduous Teeth		*Deciduous Teeth*	
Cavities	134	Cavities	27
Abscesses	0	Abscesses	0
Extractions	10	Extractions	6
Permanent Teeth		*Permanent Teeth*	
Cavities	7	Cavities	5
Abscesses	0	Abscesses	0
Extractions	0	Extractions	0

In March an eye examination of all pupils is made. The Rotary Club assists in providing glasses and has undertaken to care for the six most needy cases each year. The Club arranges with the optometrist for the examinations and the glasses. The child is examined by the optometrist (permission having been given by the child's parent) and the results of this examination are forwarded to the Chairman of the Crippled Children's Committee of the Rotary Club.

At the end of April a third quick class-room inspection is made. This is followed by a thorough class-room inspection which is made in the office, for it is found that the nurse can learn more about the pupil and can be of more help away from the listening ears of the others. The interview provides a splendid opportunity for general instruction in personal hygiene and for a close examination.

In July of last year a tonsil and adenoid clinic was held, financed by the local Rotary Club. A list of children in need of operations whose parents were unable to pay for them was submitted to the Chairman of the Crippled Children's Committee. Four of our five physicians were available at this time. They worked in pairs taking turns as surgeon and anaesthetist, each doctor operating on his own patients. In order to take care of all the needy cases on the amount of money available, the nurse offered her small apartment for a hospital. Fifteen operations were done here and several others performed in private homes.

In reference to crippled children, where the municipality provides no orthopaedic clinic and the child has to be taken to some other centre, means

of transportation must be provided. Seldom has the nurse time to take patients to clinic, but she can arrange for their transportation by taxi, bus, or train, and can see that the child is accompanied by an intelligent person who will be able to demonstrate accurately whatever exercises the masseur has given the child. After seeing these demonstrated, the nurse knows what exercises were recommended and is able to help the child with them.

SERVICE TO ADULTS

The adult health service, like other services, entails demonstration work and such routine as taking temperatures and pulse and reporting findings to the family physician if the patient is under his care, and if not, urging medical care. The fundamentals of personal hygiene are taught and an effort is made to assist in prevention and retardation of diseases specific to adult life.

SPECIAL SERVICES

Communicable Disease Control

In regard to the control of communicable disease the nurse has been instrumental in securing quarantine of about three-quarters of the cases of communicable diseases in this municipality. To make sure that no communicable diseases go unreported, the nurse telephones to all the local doctors at the beginning of each week to ask them if they have any new communicable disease cases. When on her rounds she finds a suspicious case the family physician is notified at once. Should the case prove to be a communicable disease requiring placarding, the placard is promptly affixed. The mother or attendant is instructed concerning the care of the patient, the necessity of keeping the patient properly isolated, and the importance of careful nursing to prevent complications.

Tuberculosis Service

The tuberculosis service is one in which the nurse should be keenly interested for so much can be accomplished. She can render great service by explaining to the members of the family the urgency of having an adequate chest examination by their physician. She can assist in making arrangements with the physician for the attendance of patients at the chest clinics. There is not a tuberculosis clinic in this municipality but two clinics situated in London and Stratford are readily available. Patients returning from sanatoria are visited and assisted in every way possible. The nurse can render invaluable service in tracing contacts and in giving instruction to patients who are receiving treatment at home so as to carry out properly their physician's directions.

Mental Hygiene

Mental hygiene is an essential part of a public health nursing program. It permeates almost every activity. The nurse endeavours:

1. To make more effective all her contacts with individuals and families through a better understanding of psychology and teaching methods.
2. To increase her awareness of the significance of variations of human

behaviour so that she may make more intelligent use of mental hygiene resources.

3. To equip herself to assist in the care of the mentally sick in their own homes.

Because of a number of children with speech defects, it was felt that a visit from a mental health clinic was necessary if these children were to be helped. A number of mothers who are members of the Home and School Club were consulted regarding the clinic. It was arranged that the social worker with the travelling clinic of London, Ontario, should address the club on "The Functions of the Mental Clinic." After hearing the address the mothers were so interested and felt so much the need in the town for such a service that regular visits from the mental health clinic were arranged. One evening when talking to a group of mothers the formation of a parent study group was mentioned. These women said that they had been desirous of forming such a group but that they did not know where to apply for information. An appeal was made to the mental clinic and immediately one of the workers offered her services two nights a month. At present our membership is twenty-two.

Public Health Education

Public health education is one of the nurse's largest fields. Continual repetition seems to be her lot. But, in order to educate the public, the nurse must:

1. Try, through her daily routine contacts, to arouse the individual to action for his own physical welfare.

2. Help in bringing timely health subjects before the public by means of newspaper articles, pamphlets, moving pictures, lectures, etc.

3. Assist with campaigns for specific purposes such as diphtheria immunization, summer camps for malnourished children, etc.

4. Familiarize the public with health needs and resources for their community.

As the nurse goes about her daily duties, many different questions are asked her. She will be asked for an opinion regarding the toxoiding of preschool children or for advice on prenatal care. The nurse will, of course, always explain to the mother the nursing care and refer the enquirer to the family physician. She should also give the address of the organization from which can be obtained literature on the subject.

In routine visits the mothers with teen-age girls are told of the Junior Red Cross Home Nursing Classes and are asked to send their daughters to the club. As a means of informing the citizens a monthly report is published in the local paper giving a fairly detailed account of the work done during the month. Notices of diphtheria clinic and dental survey results are also published in the town weekly. The nurse's schedule, too, is kept before the eyes of the public.

At Home and School Club meetings there is what is known as a "literature table". Among other books and papers are about twenty copies of the magazine *Health* (published quarterly), a book by Professor Blatz called *Parents and the Preschool Child*, pamphlets and leaflets published by the Canadian Welfare Council, Ottawa, and publications of the Provincial Department of Health.

Records

Let us turn now to the old drudge, the keeping of records. It is the duty of the nurse to have an accurate and adequate record system. These records should talk. A nurse who is near a university may be asked to assist in the extra-mural teaching for which she will need records as nearly ideal as possible. In these public health nursing documents the nurse sets down relevant data on cases under her care. With these data before her, she is able to give more efficient help to the people in her community. Too, these records are the basis on which her successor would work. The records:

1. Should enable the nurse to record relevant facts regarding cases under her care so that she may give them constructive health service and leave information for her possible successor.
2. Provide data for study on health and social problems.
3. Furnish directors with the number and type of cases under care so that they may determine to what extent the community's needs are being met.

Social Welfare

Social welfare concerns itself with providing the needy with the essentials of life. Although social welfare does not come directly under public health nursing, it is linked with public health work in that, to continue in health, one must have these necessities. As there is no social worker in this municipality, the nurse bridges the gap and helps as well as she can.

Many women who are on relief are glad to do a little work in return for what they receive. Knitting and quilting bees are held, and for every article that each woman makes for her own family she makes a duplicate for the nurse's cupboard, to be given to motherless families or to families where the mother is ill. Ends and scraps of wool and other warm materials are donated and these are put into squares and fashioned into blankets, afghans, or quilts. Sugar bags, at a cost of ten cents each, when washed and bleached make excellent backs for quilts. A sewing machine was donated and quilts can be completed at the town hall. In order that no favouritism be shown in distributing these articles, lots are drawn. At most of these bees the members of the local chapter of the Imperial Order of the Daughters of the Empire serve tea and a very friendly spirit prevails. Women who cannot sew are taught to do so by the ladies of the Welfare Board on Thursday afternoons at the town hall. It is felt that not only are these women being taught a constructive art but also habits of industry, to rely upon and to have confidence in themselves, and to be independent.

Some plans for the future are (1) to organize an adult home nursing group; (2) to organize a vaccination campaign; (3) to institute a nursing service in the high schools; (4) to organize an active nurse's advisory committee of well-educated alert citizens who will be interested in the work which the Public Health Department is trying to carry on; and (5) to create greater interest on the part of the general public in the public health nursing program and to make them aware of the health needs of their community.

The Value of Records and Statistics to the Medical Officer of Health*

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DURING the past two decades the larger municipalities have made great advances in keeping accurate data in regard to health. Few of the smaller municipalities, however, until recently, have been interested in keeping proper statistics. This may have been on account of lack of organization, lack of personnel, or it may be due to the fact that the medical officer of health has not in the past been interested in this type of work.

In the smaller places, particularly, any system of keeping health records must be very simple, but we must also remember that statistics are only useful when accurate. The advantages in keeping proper records in regard to health, in any municipality, may be outlined as follows:

1. To enable the board of health to judge the accomplishments of the department of health or of the medical officer of health.
2. To show the municipal council the value received for the money spent on health.
3. To provide data giving accurate information concerning the occurrence of diseases, both of cases and of deaths.
4. To make possible good administration of the department.
5. To encourage unofficial agencies to maintain an interest in health work.
6. To enable a municipality to compare its work or its costs with another of like size.
7. To permit the medical officer of health adequately to present the need and value of a new service by means of accurate statistics.
8. To allow comparison of work done by the medical officer of health, inspectors, nurses, or clinics from year to year.
9. To determine if the cost of any service is excessive for the value received.

During the past few years numerous organizations in each municipality have become increasingly interested in public health. In the rural areas the Women's Institute and in the cities the Local Council of Women have health committees. The wise medical officer of health has enlisted these groups in the furtherance of health work in his municipality, but it is useless to approach such organizations with any health program unless one can support the statements made with facts. If, for instance, the health officer is trying to interest one of these organizations in child hygiene, he must know the infant mortality rate, especially for the past few years, in order to prove that the work is worth while. In order to arrive at this rate he should have available data concerning population, live births, and number of babies dying in their first year. If the records have not been correctly kept and tabulated, the information given may be inaccurate and embarrassing questions may be asked. In most places it is very difficult for the general public to realize what health officers are doing for them unless the records show what is accomplished each year. Because of this we have come to look at records and statistics in a very different light, consider-

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ing record-keeping a very important part of the duties of the medical officer of health and essential for the proper administration of public health.

All records of health organizations should answer the following questions:

1. Is the organization performing the functions for which it exists?
2. Is the cost excessive for the services rendered or the value received by the public?
3. How many families and persons have benefited by the work? What percentage of the community?
4. What is the per caput cost? How does this compare with other places of like size?

While different types of work may demand special records, usually the service itself will decide what records must be kept. In Ontario the school records are provided by the Department of Education, while the venereal disease records and the mental health clinic records are supplied by the Department of Health. In all other services, however, there is a great variety of records. Regardless of the type of record used, the statistics therefrom must be tabulated in such a way that they are easily comprehended by the average individual and there must be some way of interchange of statistics between the different agencies in the community interested in health work.

It is possible for every medical officer of health to receive from the division-registrar a transcript of every birth and death, and a proper allocation of these will quickly separate the residents and non-residents. From the birth records an accurate idea is obtained of the extent of the child hygiene work necessary in the community, as well as essential information concerning the need for social service work. The proper allocation of causes of deaths will show also what type of work is necessary for the community.

In order that the medical officer of health may keep the board of health interested in his work, it is necessary that he should submit a proper monthly report. In rural areas this should be given whenever the board of health meets. This report should include the statistics for the previous month, as well as a detailed report of the work done by the medical officer, inspectors, nurses, and clinics. The local paper usually will publish this report in full, providing an excellent way in which to interest the citizens in health matters.

Realizing the lack of uniformity in the presentation of vital statistics in annual reports of the larger cities and towns in Canada, a committee of the Section of Vital Statistics of the Canadian Public Health Association obtained the consensus of opinion of health officers as to the essential data which should be published and prepared suitable tables. These tables have been approved by the Association and have been made available to municipal health officers during the past two years. In Ontario the Department of Health has incorporated these tables in the annual report form required from medical officers of health by the Department.

DATA FROM THE REPORTS OF TWENTY CITIES IN ONTARIO

As the new report forms supply the essential data in a form which permits of some degree of comparison, a study was made of twenty cities in Ontario having a part-time health officer.

Birth and Mortality Data

A comparison of the birth rates is presented in table I. The rates given are for residents only.

TABLE I

POPULATION AND RESIDENT BIRTH RATES
Certain Cities of Ontario, 1935

City	Population	—Birth Rates— Live	Stillbirth
1. St. Catharines	26,854	15.6	.52
2. Kingston	24,173	18.7	.29
3. Oshawa	24,120	17.7	.83
4. Sault Ste. Marie	23,064	18.6	.91
5. Sudbury	22,116	27.5	.67
6. Guelph	21,139	16.0	.66
7. Port Arthur	20,352	22.4	.58
8. Timmins	19,076	32.4	1.20
9. Niagara Falls	18,355	19.0	.92
10. Sarnia	18,064	18.0	.88
11. Stratford	17,627	14.4	.34
12. North Bay	16,594	16.8	.66
13. St. Thomas	16,123	13.2	.62
14. Chatham	15,957	17.6	.88
15. Galt	14,002	16.0	.50
16. Owen Sound	13,139	16.2	.91
17. Woodstock	11,101	14.1	.81
18. Cornwall	12,507	33.7	.55
19. Welland	10,402	31.5	.70

Similarly, in table II the death rates for these cities are presented, together with the infant mortality and maternal mortality rates, the latter being calculated as per 1,000 living births.

TABLE II

DEATH RATES (RESIDENTS ONLY)
Certain Cities of Ontario, 1935

City	General Rate	Infant Mortality Rate	Maternal Mortality Rate
1. Port Arthur	6.5	32.3	6.6
2. Oshawa	6.9	42.0	.3
3. North Bay	8.3	68.0	0
4. Niagara Falls	8.6	45.6	0
5. Welland	8.7	44.0	8.8
6. St. Catharines	8.9	35.2	3.5
7. Owen Sound	9.4	56.3	4.5
8. Galt	10.2	48.8	4.4
9. Sarnia	10.3	67.8	9.3
10. Sault Ste. Marie	10.3	59.1	5.5
11. Woodstock	10.5	31.5	0
12. Timmins	11.0	121.3	0
13. Stratford	11.0	60.2	0
14. Guelph	11.0	58.6	4.5
15. Sudbury	11.5	59.0	0
16. Cornwall	12.2	68.7	2.3
17. Chatham	12.4	81.0	0
18. Kingston	12.5	30.7	4.5
19. St. Thomas	13.0	75.0	9.2

The question of statistics relating to non-residents is important. Health

officers are usually careful to exclude all deaths of non-residents in order to keep the rate as low as possible but one may ask if they are as anxious to add to their records the deaths of persons from their own municipalities who die elsewhere. Our statistics will never be correct unless they take into account both the residents and the non-residents. This is a subject which is being actively studied by another committee of the Canadian Public Health Association and it is pleasing to record that as a result of the efforts which have been made and of the co-operation of the Dominion Bureau of Statistics in Ottawa preliminary steps have been taken by the Bureau to provide for the reallocation of deaths.

Immunization against Diphtheria, Smallpox, and Scarlet Fever

Of special interest is the comparison of the amount of diphtheria immunization work undertaken in these twenty municipalities. In all these cities a very considerable number has been immunized. The value of diphtheria toxoid is indicated by the fact that during the year 1935 only one resident death from diphtheria was reported by these municipalities. In table III immunizations recorded by the medical officers of health for the prevention of diphtheria, smallpox, and scarlet fever are shown. In the prevention of diphtheria and

TABLE III

IMMUNIZATIONS GIVEN BY THE MEDICAL OFFICER OF HEALTH
Certain Cities of Ontario, 1935

City	Diphtheria	Smallpox	Scarlet Fever	Total
1. Sarnia	41	1,359	862	2,262
2. St. Catharines	553	1,365	0	1,918
3. Oshawa	525	427	546	1,498
4. Timmins	507	753	0	1,260
5. Kingston	1,198	9	30	1,237
6. Port Arthur	400	375	300	1,075
7. Niagara Falls	502	470	40	1,012
8. North Bay	239	565	3	807
9. Sault Ste. Marie	312	239	225	776
10. Guelph	723	28	0	735
11. Stratford	273	428	0	701
12. Woodstock	301	277	0	578
13. St. Thomas	20	345	122	487
14. Chatham	480	0	0	480
15. Galt	100	200	60	360
16. Cornwall	200	50	100	350
17. Owen Sound	125	0	0	125
18. Welland	12	40	2	54

smallpox one may consider the situation as satisfactory if the number immunized exceeds the number of live births each year, provided that the work has been carried on for some years.

Scarlet fever immunization requiring five doses of suitably diluted scarlet fever toxin is not a measure which has been adopted by many cities. Considerable immunization has been conducted in Sarnia, Oshawa, Port Arthur, St. Thomas and Owen Sound. It will be interesting to learn in the course of a few years the apparent value of this procedure, as the municipalities which have used this method are impressed with its value.

Cost of Health Services

The cost of health services in the different cities varies considerably, as shown in table IV. It must be remembered that in some cities the school health work is directly under the board of health and is therefore a charge on that board; in other cities the school work is done under the direction of the board of education and is not charged to the board of health. This may account for the discrepancy in the per caput cost as shown in this table. If we are to compare the cost of health service, it will be necessary for each city to use a standard form of budget. Such a form has not yet been discussed.

TABLE IV

COST OF HEALTH WORK
Certain Cities in Ontario, 1935

City	Population	Per Caput Cost
1. Oshawa	24,120	.56
2. Stratford	17,627	.55
3. St. Thomas	16,123	.50
4. Woodstock	11,101	.47
5. Welland	10,402	.45
6. Sarnia	18,064	.41
7. North Bay	16,594	.41
8. Port Arthur	20,352	.38
9. Guelph	21,139	.37
10. Galt	14,002	.37
11. St. Catharines	26,854	.36
12. Niagara Falls	10,355	.31
13. Sault Ste. Marie	23,064	.28
14. Chatham	15,957	.25
15. Owen Sound	13,139	.17
16. Sudbury	22,116	.16
17. Kingston	24,173	.14

Tuberculosis Mortality

The tuberculosis mortality as presented in these reports indicates the importance of this disease as a cause of death. The uncorrected rates vary greatly. Regardless of how careful the medical officer of health may be in regard to statistics, these may be quite incorrect unless a careful check is made in regard to residents. This is especially true in considering tuberculosis mortality because, as stated previously, the number of deaths by place of occurrence may not give a true picture in certain cities of the actual number of deaths. A sanatorium may be located in a city which serves a number of municipalities in addition to the city. If all the deaths occurring in the sanatorium are recorded as deaths in the city, a false picture is presented. Table V indicates the correction which is necessary when deaths are reallocated according to residence for cities in Ontario with a population under 35,000.

RECORDS IN COMMUNICABLE DISEASE CONTROL

In the instance of communicable disease it is important for the individual that a recovery certificate be issued by the department. Such a certificate will

TABLE V

TUBERCULOSIS MORTALITY, 1934
Cities in Ontario under 35,000 Population

City	Deaths by place of occurrence	Deaths of of non-residents	Residents who died elsewhere	Total tuberculosis deaths of residents
1. Belleville	6	1	3	8
2. Brantford	13	3	1	11
3. Chatham	4	2	5	7
4. Cornwall	11	5	2	8
5. Fort William	10	2	4	12
6. Galt	4	0	1	5
7. Guelph	3	1	7	9
8. Niagara Falls	2	0	2	4
9. North Bay	5	2	1	4
10. Oshawa	8	0	4	12
11. Owen Sound	3	2	2	3
12. Peterborough	8	0	0	8
13. Port Arthur	10	5	6	11
14. Sault Ste. Marie	7	3	1	5
15. Stratford	1	0	6	7
16. Sudbury	13	3	3	13
17. St. Catharines	3	0	8	11
18. St. Thomas	2	1	4	5
19. Timmins	6	1	11	16
20. Welland	2	0	3	5
21. Woodstock	2	0	2	4

be of value to the individual if he should happen to be a contact of the disease. By possessing the certificate the individual may be released from quarantine. If a family has moved to another municipality such a record may prevent a child from losing valuable time at school. It is difficult, however, to have the parents keep the certificate available. In St. Catharines for some years a large envelope has been supplied and the mother has been instructed to keep in this envelope the certificate of birth registration and the diphtheria toxoid and smallpox vaccination certificates as well as any other records in regard to the child's health. Close co-operation between the health department and the school authorities is necessary in regard to immunization records. When a child is immunized, not only should a certificate be given but a proper record should be kept at the department of health, and, if a school child, a notation should be made on the A.D.P. card.

RECORDS AND THE DEPARTMENT

Every official of the board of health should keep a daily record of the work undertaken. From such daily records information can be readily tabulated for presentation to meetings of the board and will be readily available for use in the preparation of the annual report. Proper records and statistics are not only interesting but are essential to the work of every medical officer of health. If progress in health work is to be expected, adequate and accurate records must be kept which will permit in the future of proper comparison of results from year to year.

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INSULIN & PROTAMINE

IN the April issue of this journal a statement was published from the Departments of Physiology and Medicine, University of Toronto, and the Medical Service, Toronto General Hospital, by Doctors Kerr, Best, Campbell and Fletcher briefly reviewing the laboratory evidence of the effectiveness of certain protamines in delaying the absorption of Insulin following hypodermic administration and presenting a preliminary report of the clinical experience relating to twenty-five cases treated with Insulin & Protamine. This paper presented the first Canadian clinical data. In the past four months extensive clinical trial has been made by diabetic specialists throughout Canada and the United States. The findings of the Department of Metabolism, Montreal General Hospital, were reported in the *Canadian Medical Association Journal* in August. This confirmation of the findings of Hagedorn, Jensen, Krarup and Wodstrup-Nielsen, the Danish investigators who first suggested the addition of protamine to Insulin, is most encouraging. It would appear that for certain patients the number of daily injections can be considerably reduced.

During the years which followed the discovery of Insulin, intensive chemical investigations were conducted. In 1926 Insulin was first obtained in crystalline form. Clinical trial of highly purified Insulin was disappointing in that the duration of the physiological effects produced was shortened. Subsequently efforts were made in many laboratories to combine Insulin with some substance so that the Insulin in the resulting combination would be liberated slowly and its effects prolonged. The addition of protamine to Insulin, in a suitable buffer solution, results in a fine flocculent precipitate. As the stability of Insulin & Protamine is not definitely established, it has been necessary for the patient to prepare the mixture, using it within a few days. It is hoped, however, that further studies may make possible the distribution of Insulin & Protamine in a stable suspension.

In the brief period of four months which have elapsed since the first clinical trial of this product in Canada, trial has been made also of Insulin & Protamine containing minute quantities of zinc. In the current issue of the *Canadian Medical Association Journal,* Dr. Rabinowitch and his colleagues of the Department of Metabolism, Montreal General Hospital, published their

findings in a series of cases, indicating that the addition of zinc in the minute quantities used has definitely increased the effectiveness of Insulin & Protamine. Similar clinical findings have been obtained in other centres. The importance of zinc in the crystallization of Insulin was established by Dr. D. A. Scott and in connection with these studies various metals were investigated. Zinc is found in almost every tissue of animals and particularly large quantities have been found to occur in the pancreas. The possible relationships between this metal, the pancreas, Insulin, and diabetes are the subject of intensive study. As early as last December the effects of adding traces of zinc to Insulin & Protamine were made a subject of investigation in the Connaught Laboratories. Certain desirable effects having been noted in laboratory experiments, Dr. Scott and Dr. A. M. Fisher reported these at a scientific meeting in Washington last March. Thereupon clinical trials of Insulin & Protamine containing minute quantities of zinc were undertaken in numerous centres throughout the United States and Canada. It is still too early to make final assessment of the advantages of different types of Insulin & Protamine preparations. It is anticipated, however, that such assessment can be made at an early date and that preparations of Insulin & Protamine satisfactory for general distribution will be available at some time early this fall.

PERNICIOUS ANAEMIA

PERNICIOUS ANAEMIA is a relatively new disease in medical history, for though Combe described the first recorded case in 1822, the first accurate account of it is that given by Addison in 1855. Many years of effort in intensive inquiry and research culminated in the announcement by Minot and Murphy in August, 1926, of the results obtained in typical cases of pernicious anaemia on an abundant liver diet. This development was followed by the wide use and general introduction of liver therapy in treatment.

The synchronous abrupt decline in mortality in 1927 throughout the world may be interpreted as evidence of the efficacy of this treatment in prolonging the lives of persons with pernicious anaemia. There is, however, no indication that the case incidence has declined; and indeed if heredity plays any role in the transmission of the disease, there is reason to expect an increase in the number of cases requiring treatment. Reduction in mortality through effective treatment is undoubtedly a measure of success but the fact remains that, as in diabetes, we are at present limited to palliative measures only. The recent development of intramuscular therapy has provided the medical profession with a more effective treatment. The difficulties formerly encountered in getting patients to take adequate liver by mouth can now be overcome and the disease can be more effectively and more economically treated.

The immediate clinical outlook in pernicious anaemia has been improved but the problem is not solved. Pernicious anaemia is still an important cause of death among persons from 40 to 79 years. There is need for data relating to the true incidence of the disease and for further details concerning mortality. It is through such a confidential study of deaths from all forms of anaemia that these essential data can be obtained.

REPORTS FROM THE ANNUAL MEETING*

Part IV

REPORT AND RECOMMENDATIONS CONCERNING THE REVISION OF THE INTERNATIONAL LIST OF CAUSES OF DEATH

COMMITTEE ON CERTIFICATION OF CAUSE OF DEATH

THE Committee have given careful thought to the essential points which they believe merit consideration in the revision of the International List of Causes of Death in Paris, France, in 1938. The report of the Committee, given in the following pages, reflects the considered opinion of the persons composing this Committee, and is in no way to be regarded as an expression of official opinion as far as Canadian practice is concerned.

The recommendations incorporated in this report have been drafted after a detailed study of English, French, and United States practice, with the fundamental principles and objects of medical records of causes of death clearly in mind. New medical opinions and knowledge have been noted. The importance of increasing the simplicity of the list and at the same time broadening the practical usefulness of mortality statistics, as well as the ultimate ideal—uniformity in international codification and practice—have constantly been in the forefront in arriving at the following recommendations.

The preliminary report and recommendations of this Committee were presented and discussed in full at a special conference on vital statistics at the Royal York Hotel, Toronto, May 4th and 5th last. At this time a number of further changes were suggested and incorporated in the Committee's report. The revised text which follows was formally presented and endorsed at the close of this conference.

RECOMMENDATIONS

CLASS I: INFECTIOUS AND PARASITIC DISEASES (Title numbers 1-44)

(1) THAT title 17 be changed to "Encephalitis, lethargic and other epidemic forms" with subtitles (a) lethargic and (b) other epidemic forms.

(2) THAT title 18 be changed to "Meningococcus meningitis" and the terms acute cerebrospinal meningitis and cerebrospinal meningitis be transferred to rubric 79, *Simple meningitis.*

(3) THAT the terms "specific bronchitis" (23), "specific pneumonia" (23), "specific meningitis" (24), and "specific peritonitis" (25), be transferred to 34, *Syphilis.*

(4) THAT rubric 35, *Gonococcus infections and other venereal diseases,* be subdivided into (a) gonococcus infection, and (b) other venereal diseases.

(5) THAT the term "haemorrhagic jaundice" (Weil's disease) be added to rubric 39, *Other diseases due to protozoal parasites.*

(6) THAT the terms "granuloma inguinale," "granuloma venereum" from 139(d), *Diseases of the female genital organs (not specified as venereal),* and similar terms from rubric 138, *Diseases*

**Presented at the Twenty-fifth Annual Meeting of the Canadian Public Health Association, Vancouver, B.C., June, 1936.*

of male genital organs (non-venereal), be transferred to 35, *Gonococcus infection and other venereal diseases.*

(7) THAT the terms "Vincent's angina," "septic sore throat," "streptococcic angina," and "streptococcic sore throat" be transferred from title 115(c), *Other diseases of the buccal cavity and adnexa*, to title 44, *Other infectious and parasitic diseases*, subtitle (d).

(8) THAT the terms "herpes zoster," "shingles," and "zona" be transferred from title 153. *Other diseases of the skin and adnexa and of the cellular tissue*, to title 44, *Other infectious and parasitic diseases*; that the new terms "post-infectious encephalitis" and "infectious mononucleosis" be added; and that the term "trachoma" be transferred from 88, *Diseases of the Organs of Vision*, to 44.

CLASS II: CANCER AND OTHER TUMOURS (Title numbers 45-55)

(1) THAT "cancer of pelvic viscera" be transferred from rubric 46(g), *Cancer and other malignant tumours of other organs of the digestive tract*, to 53(i), *Cancer and other malignant tumours of other and unspecified organs.*

(2) THAT rubrics 48 and 49 be consolidated and be called 48, *Cancer and other malignant tumours of the female genital organs.* To maintain the continuity and effectiveness of data in their former divisions, it is further recommended that this title be divided into 48(a), *Cancer and other malignant tumours of the uterus*, 48(b), *Cancer and other malignant tumours of the cervix uteri*, and 48(c), *Cancer and other malignant tumours of other female genital organs.*

(3) THAT rubric 50, *Cancer and other malignant tumours of the breast*, now become rubric 49 in keeping with the combining of titles 48 and 49 above.

(4) THAT rubric 51, *Cancer and other malignant tumours of the male genito-urinary organs*, be changed to rubric 50 and be called "Cancer and other malignant tumours of the genital organs of the male"; and further, that the inclusions under this title be those now included under 51(c), (d), and (e); those under 51(a) and (b), with the exception of cancer of adrenal gland, being transferred to the new title 51 (see 5 below).

(5) THAT a new title, numbered 51, be introduced called "Cancer and other malignant tumours of the urinary organs (both sexes)" and that the terms included hereunder comprise those formerly included under 51(a) and (b), *Cancer and other malignant tumours of the male bladder and kidneys*, and 53(d), *Cancer and other malignant tumours of the female urinary organs*, with the exception in both cases of cancer of the adrenal (suprarenal) gland.

(6) THAT rubric 53, *Cancer and other malignant tumours of other and unspecified organs*, remain the same except for the transfer of certain titles formerly under 53(d) to rubric 51, *Cancer and other malignant tumours of the urinary organs*, as indicated in (5) above).

(7) THAT cancer of adrenal (suprarenal) gland (male) be transferred from rubric 51(b), *Cancer and other malignant tumours of the male genito-urinary organs*, to 53, *Cancer and other malignant tumours of other or unspecified organs.*

(8) THAT cancer of nose and nostrils be transferred to rubric 53, *Cancer and other malignant tumours of other and unspecified organs*, unless qualified as "Cancer of nose (skin)", when it is to be retained under 52, *Cancer of the skin.*

(9) THAT consideration be given to classifying non-malignant tumours to the organ affected, e.g. adenoma of thyroid and toxic adenoma of thyroid under 66, *Diseases of the thyroid and parathyroid glands*, instead of under 54(e), *Non-malignant thyroid tumours.*

CLASS III: RHEUMATIC DISEASES, NUTRITIONAL DISEASES, DISEASES OF ENDOCRINE GLANDS AND OTHER GENERAL DISEASES (Title numbers 56-69)

(1) THAT the following suggestion be considered: Change of the title of rubric 56, *Acute rheumatic fever*, to "Rheumatic fever," with subdivisions (a) Acute, (b) Chronic, (c) Unspecified as acute or chronic.

THAT the terms to be included under this revised title to be drafted from 56, 87, 90, 92, and 95. The complete inclusions under the various divisions of this new title are set out by the Committee as follows:

56. Rheumatic Fever:—this title to include

(*a*) *Acute*

Acute articular rheumatism
rheumatic arthritis
carditis
chorea
Acute rheumatic endocarditis
fever
heart disease
mitral endocarditis
rheumatism

(*b*) *Chronic*

Chronic rheumatic carditis
endocarditis
(transferred from 92a)
Chronic rheumatic myocarditis
pericarditis (transferred from 90)

(c) *Unspecified as acute or chronic*

Articular rheumatism
Febrile rheumatism
Mitral stenosis (transferred from 92a)
Rheumatic carditis
chorea (transferred from 87e)
endocarditis
fever
heart disease (transferred from 95b)
Rheumatic hyperpyrexia
meningitis
myocarditis
pandarditis
peritonitis
pleurisy
valvular disease of the heart (transferred from 92a)

The above recommendation provides for the following transfers (see also recommendations (1), (2), and (3) of Class VII on page 44) of terms in the present list:

(i) From rubric 87(e)—rheumatic chorea.
(ii) From rubric 90—chronic rheumatic pericarditis.
(iii) From rubric 92(a)—chronic rheumatic endocarditis.
(iv) From rubric 92(a)—rheumatic valvular disease of heart.
(v) From rubric 92(a)—mitral stenosis.
(vi) From rubric 95(b)—rheumatic heart disease.

The Committee feels that this tabulation could be carried out in addition to the present scheme so that the comparability of data would not be disturbed, and that it would be extremely valuable to have mortality data classified on the basis outlined above.

(*Note*—A special subcommittee was appointed, consisting of Dr. Paul Parrot, Dr. E. Gagnon, Dr. N. E. McKinnon, and Dr. A. H. Sellers to study the above recommendation. It was pointed out that the suggestion made by the Committee would, as it now stands, to some extent invalidate secular comparison of cardiac mortality unless for some years at least a tabulation was made according to the present scheme, supplementary to the classification of the proposed scheme. It was felt that this suggestion deserved further study because of the practical implications, and the need for data on the points covered by the recommendation.)

(2) THAT the terms "atropic arthritis," "degenerative arthritis," "hypertrophic (proliferative) arthritis," and Still's disease (from 156a), be added to the list of inclusions under 57, *Chronic rheumatism, osteoarthritis.*

(3) THAT rubric 66, *Diseases of the thyroid and parathyroid glands*, be revised, adding to 66(a) the terms "adenoma of thyroid gland," "adenomatous goitre," "cystic goitre," and to 66(b) the term "toxic adenoma of thyroid gland." This procedure eliminates 54(e) of the Canadian list, *Non-malignant tumours of the thyroid gland.*

(4) THAT the term "hypodrenalinism" be added to title 68, *Diseases of the adrenals.*

(5) THAT titles 69(a) and (b) be consolidated as 69(a), *Degeneration of unstated origin*, and that 69(c) be changed to 69(b), *Other general diseases*, and that the various fatty degenerations (heart, etc.) be classed to the organ affected.

CLASS IV: DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS
(Title numbers 70-74)

(1) THAT the term "essential thrombocytosis" be added to items included under title 70(a), *Simple purpuras.*

CLASS V: CHRONIC POISONINGS AND INTOXICATIONS (Title numbers 75-77)

(1) THAT the terms "alcoholic apoplexy," "alcoholic cerebral apoplexy," "alcoholic cerebral oedema," now under rubric 87(a), *Cerebral haemorrhage*; "alcoholic neuritis" and "alcoholic polyneuritis," now under rubric 87(b), *Neuritis and neuralgia*; and "alcoholic gastritis," now under rubric 118, *Other diseases of the stomach (cancer excepted)*, all be transferred to rubric 75, *Alcoholism (acute or chronic)*.

(2) THAT the term "epidemic gangrene" be deleted from the list of terms under 76(d), *Other chronic poisonings by organic substances*.

CLASS VI: DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE (Title numbers 78-89)

(1) THAT rubric 79, *Simple meningitis*, be subdivided into (a) Simple meningitis, and (b) Acute cerebrospinal meningitis (other than of meningococcic origin) and that the rubric title be changed from "Simple meningitis" to "Meningitis." It is further recommended that the terms included under (b) part of this rubric be "acute cerebrospinal meningitis" (not meningococcic) and "cerebrospinal meningitis," transferred from rubric 18, *Meningococcus meningitis*.

(2) THAT the terms "alcoholic apoplexy," "alcoholic cerebral oedema," "alcoholic cerebral apoplexy," and "alcoholic cerebral congestion," be transferred from 82(a), *Cerebral haemorrhage*, to title 75, *Alcoholism (acute or chronic)*. The Committee also recommends that the term "cerebral infarction" be transferred from subtitle 82a, *Cerebral haemorrhage*, to subtitle 82b, *Cerebral embolism and thrombosis*.

(3) THAT the terms "senile paresis" and "senile paralysis", now under 82(d), *Hemiplegia and other paralysis, cause not specified*, be referred to physicians for further data, and that these terms be transferred to 162(b), *Senility without dementia (70 years and over)*.

(4) THAT consideration be given to deleting rubric 86, *Convulsions under five years of age*. The Committee recommends further that additional information should be sought by supplementary inquiry in all deaths which would be classed under this heading and that in the event of failure to secure information as to the true cause of death, such cases should be classed under title 200, *Cause of death not specified or ill-defined*. As a possible compromise between the present practice and complete abolition of this title, it is recommended that it be limited to infants under one year of age.

(5) THAT the terms "alcoholic neuritis," and "alcoholic polyneuritis" be transferred from 87(b), *Neuritis and neuralgia*, to title 75, *Alcoholism*.

(6) THAT the terms "trachoma" and "trachomatous conjunctivitis" be transferred from 88, *Diseases of organs of vision*, to 44, *Other infectious and parasitic diseases*, subtitle (d).

CLASS VII: DISEASES OF THE CIRCULATORY SYSTEM (Title numbers 90-103)

(1) THAT the term "chronic rheumatic pericarditis" be transferred from 90, *Pericarditis*, to title 56(b), *Rheumatic fever (chronic)*.

(2) THAT the terms "chronic rheumatic endocarditis," "rheumatic valvular disease of heart," and "mitral stenosis" be transferred from 92(a), *Chronic endocarditis*, to 56(b), *Rheumatic fever (chronic)*.

(3) THAT the term "rheumatic heart disease" be transferred from rubric 95(b), *Other and unspecified diseases of the heart*, to 56, *Rheumatic fever (unspecified as acute or chronic)*.

(4) THAT when "auricular fibrillation," now included under 95(a), *Other diseases of heart-functional*, is certified alone on the death certificate, inquiry should be made to determine the existence and nature of any organic heart disease which gave rise to this condition.

(5) THAT the title of 102, *Idiopathic abnormalities of the blood pressure*, be changed to "Arterial hypertension"; that the terms "essential hypertension", and "hypertensive vascular disease" be added, and that the term "hypotension" and synonyms be deleted from the inclusions under this title and added to 103, *Other diseases of the circulatory system*. The Committee also recommends that this title be subdivided into (a) *Essential (malignant) hypertension*, and (b) *Other forms*, with appropriate distribution of the titles included hereunder.

CLASS VIII. DISEASES OF THE RESPIRATORY SYSTEM (Title numbers 104-114)

(1) THAT in death certified to "oedema of glottis," or "oedema of larynx" (105b, *Other diseases of the larynx*), inquiry should be made to determine the cause of this condition.

(2) THAT occupational interstitial pneumonia and other specific occupational diseases of the respiratory system be separated from the inclusions under title 114(a), *Other diseases of the respiratory system (tuberculosis excepted)*, by the provision of an additional subtitle; viz. (a) occupational diseases of the respiratory system, (b) gangrene of the lung, (c) chronic interstitial pneumonia (not occupational), (d) others.

CLASS IX: DISEASES OF THE DIGESTIVE STATE (Title numbers 115-129)

(1) THAT the terms "septic sore throat," "streptococcal sore throat," and "Vincent's angina" be transferred from title 115, *Diseases of the buccal cavity and pharynx*, to title 44(d), *Other infectious and parasitic diseases.*

(2) THAT the term "gastro-intestinal ulceration" be transferred from 117, *Ulcer of stomach and duodenum*, to 119, *Diarrhoea and enteritis under 2 years of age*, or 120(b), *Ulceration of the intestines (2 years and over)*, according to age.

(3) THAT the term "alcoholic gastritis" be transferred from rubric 118, *Other diseases of stomach (cancer excepted)*, to 75, *Alcoholism (acute or chronic)*.

(4) THAT "athrepsia" 3 months and less than 1 year be transferred from 119, *Diarrhoea and enteritis (under 2 years of age)*, to title 158, *Congenital debility*; and that "athrepsia," 1 year and less than 2 years, and 2 years and over, now under 119 and 120(a), *Diarrhoea and enteritis*, be transferred to title 200, *Cause of death not specified or ill-defined.* (See also Class XV(1), below.)

(5) THAT consideration be given to the revision of title 13, *Dysentery*, and to the transfer of rubrics 119 and 120 (*Diarrhoea and enteritis*) or parts thereof, to Class I, *Infectious and parasitic diseases.*

CLASS X: DISEASES OF THE GENITO-URINARY SYSTEM (Title numbers 130-139)

(1) THAT the term "nephrosis" be added to inclusions under 133, *Other diseases of kidney*.

(2) THAT the terms "granuloma inguinale" and "granuloma venereum" be transferred from 138 and 139(d), *Diseases of male and female genital organs (not venereal)*, respectively, to 35(b), *Other venereal diseases.*

CLASS XI: DISEASES OF PREGNANCY, CHILDBIRTH, AND THE PUERPERAL STATE (Title numbers 140-150)

(1) THAT the term "unavoidable haemorrhage" be retained under the approved terms for 144(a), *Placenta praevia*; and that the term "detachment of placenta" be also retained.

(2) THAT it be specifically indicated that the terms "accidental haemorrhage" and "antepartum haemorrhage" are to be classed to 144(b), *Other puerperal haemorrhages*, and not to 141(a), *Abortion without mention of septic conditions (not self-induced)* when period of gestation is 6½ months or over; and that the terms "accidental haemorrhage of pregnancy" and "antepartum haemorrhage" now included under 141(a) be qualified to clarify this point.

CLASS XII: DISEASES OF THE SKIN AND CELLULAR TISSUE (Title numbers 151-153)

(1) THAT the terms "herpes zoster," "shingles," and "zona" be transferred from title 153, *Other diseases of the skin and adnexa and cellular tissue*, to title 44(d), *Other infectious and parasitic diseases.*

CLASS XIII: DISEASES OF BONES AND ORGANS OF LOCOMOTION (Title numbers 154-156)

(1) THAT "Still's disease," now included under 156(a), *Diseases of the joints (tuberculosis and rheumatism excepted)*, be transferred to 57, *Chronic rheumatism, osteoarthritis.*

CLASS XIV: CONGENITAL MALFORMATIONS (Title number 157)

(1) THAT "pyloric stenosis" when not specified as congenital be retained under title 157, *Congenital malformations*, if age is less than 6 months; and that "pyloric stenosis" not specified as congenital be classed under 118, *Diseases of the stomach*, when the age is 6 months and over.

CLASS XV: DISEASES OF EARLY INFANCY (Title numbers 158-161)

(1) THAT "athrepsia" under 3 months be transferred from 161, *Other diseases peculiar to early infancy*, subtitle (d), Athrepsia, to title 158, *Congenital debility.*

CLASS XVI: SENILITY (Title number 162)

(1) THAT this title be reserved for deaths of persons 70 years of age and over, and that further data should be sought in deaths ascribed to senility at younger ages. The Committee further recommends that this title have but two sub-titles, 162(a), *Senile dementia (70 years and over)*, and 162(b), *Other forms of senile decay (70 years and over) without senile dementia.*

(2) THAT supplementary inquiries be made in all deaths now classed under 162(c) *Premature senility (55 years and under 70 years)*. If no cause can be ascertained for this group, the Committee recommends that they be classed under 200, *Cause of death not specified or ill-defined.* It is also recommended that those cases reported as "senile dementia" under age 70 years should be classed to title 84, *Dementia praecox and other psychoses.*

CLASS XVIII: CAUSES OF DEATH UNKNOWN, UNDETERMINED, OR ILL-DEFINED (Title numbers 199-200)

(1) THAT all rubrics now devoted to "No cause given, no doctor in attendance" as 161(f) (under 3 months) and 162(d) (70 years and over), be placed under 200, *Cause ill-defined, unknown, or not specified.*

R. D. DEFRIES, *Chairman*; H. E. YOUNG, E. S. MACPHAIL, M. R. BOW, WM. WARWICK, PAUL PARROT, S. J. MANCHESTER, T. E. ASHTON, E. GAGNON, AND A. H. SELLERS, *Secretary.*

RESOLUTION

Following the presentation of this report and discussion by the members attending the conference called by the Section on May 4 and 5, 1936, the following resolution was unanimously adopted:

WHEREAS the Fifth Decennial Revision of the International List of Causes of Death will be made in 1939,

AND WHEREAS the preliminary conference of the "Mixed Committee" representing the International Institute of Statistics and the Health Committee of the League of Nations will be held in October, 1936, in Athens,

AND WHEREAS certain recommendations relating to the revision of the International List will be submitted to the Dominion Bureau of Statistics and to the Department of Pensions and National Health of Canada for consideration,

AND WHEREAS in the opinion of this conference Canada should be officially represented,

Be it resolved that this conference strongly urge upon the Dominion Government the desirability that the Dominion Bureau be officially represented at the conference in Athens in 1936.

REPORT OF THE COMMITTEE ON HOUSING

THE appointment of a national Committee on Housing followed the presentation of papers at the twenty-fourth Annual Meeting and subsequent discussions by the Executive Committee and members of the Association. From the standpoint of the medical officer of health, existing legislation as provided under the various provincial Public Health Acts and Regulations has not made possible the performance of his duties in a satisfactory manner. In the few months which have elapsed since the appointment of the Committee, a draft of a model law providing minimum standards of housing as relating to health has been prepared. Copies of this will shortly be placed in the hands of the Committee and will be discussed with members in the various provinces in order to obtain as wide an expression of opinion as possible.

The following are the members of the national Committee: Dr. H. G. Grant, Halifax; Dr. B. C. Keeping, Charlottetown; Dr. William Warwick, Fredericton; Mr. Aimé Cousineau, C.E., Montreal; Dr. Grant Fleming, Montreal; Mr. T. J. Lafreniere, Montreal; Dr. R. St. J. Macdonald, Montreal (Chairman); Dr. P. A. T. Sneath, Toronto; Dr. J. W. Fraser, Kitchener, Ont.; Dr. Gordon P. Jackson, Toronto; Dr. L. A. Pequegnat, Toronto (Secretary); Dr. J. T. Phair, Toronto; Dr. A. J. Douglas, Winnipeg; Dr. R. O. Davison, Regina; Dr. M. R. Bow, Edmonton; and Dr. G. F. Amyot, Vancouver.

L. A. PEQUEGNAT, *Secretary.* R. ST. J. MACDONALD, *Chairman.*

FIFTH ANNUAL REPORT OF THE COMMITTEE ON NON-RESIDENT BIRTHS AND DEATHS

THERE is no doubt that the next important step to be taken in improving the value and reliability of vital statistics is that step which will achieve the early routine reallocation to place of residence. To this end, inter-provincial co-operation must be secured in supplying copies of certificates of non-resident births and deaths to the central office of the province to which they belong. More important, however, is the need for establishing a scheme for effecting such transfers within each province, for those municipalities which desire it. Until this is done, the recorded birth and death rates, which appear in many municipal health reports, will have only a restricted statistical meaning.

As recommended by the Committee in its earlier deliberations, responsibility for the interchange of essential facts must rest with each province. In an endeavour to encourage the provinces to undertake the responsibility for effecting a routine system of mutual interchange of copies of birth and death certificates of non-residents, the Committee this year considered the organization necessary to achieve this objective. Recently the following memorandum was submitted to the executive officer in charge of vital statistics in each of the provincial departments.

MEMORANDUM

REALLOCATION OF BIRTHS AND DEATHS BY PLACE OF RESIDENCE

For years it has been generally realized that our present national system of compiling statistics of births and deaths by place of occurrence does not accurately reflect the facts. Under the existing scheme the recorded birth and death rates, particularly for larger municipalities, are influenced in a large measure by the location of hospitals, sanatoria and other institutions. This is the direct result of the practice of classifying births and deaths by place of occurrence. Population, on the other hand, is enumerated by place of residence.

With the formation of the Section of Vital Statistics in the Canadian Public Health Association in 1929, the importance of this problem was clearly recognized. A committee was therefore appointed to study this problem and to make recommendations.

Definite progress* has been achieved since this Committee first convened in Montreal.

*(1) C.P.H.J., 24:276, 1933.
(2) C.P.H.J., 24:396, 1933.
(3) C.P.H.J., 25:396, 1934.
(4) C.P.H.J., 26:299, 1935.

At this time three major recommendations were made embodying the essentials of this problem, viz.:

(*a*) That the responsibility for drawing of the definitions and rulings essential to a system of allocation should rest with the Dominion Bureau of Statistics.

(*b*) That the "usual place of abode" should determine residence in the case of a death, and, in the case of a birth, the usual place of abode of the mother shall be taken.

(*c*) That the responsibility for administration in effecting an interchange of essential facts should rest with each province.

Following upon these recommendations, leadership in this matter was immediately assumed by the Dominion Bureau of Statistics, Ottawa. In co-operation with the Committee a special investigation was undertaken covering the years 1930-31-32, and complete re-allocation of births and deaths to place of residence was made.

The reports published by the Bureau showing the results of this work have indicated the extent to which re-allocation by residence influences recorded birth and death rates. The following table gives a summary of the changes in recorded rates for certain large Canadian cities.

PERCENTAGE CHANGE IN RECORDED RATES OF MORTALITY AFTER REALLOCATION TO PLACE OF RESIDENCE

Certain Cities of 20,000 and over—Canada, 1931

City	Percentage change in Rate		
	Crude Mortality	Infant Mortality	Tuberculosis
Calgary	−10.8	+ 3.7	+20.1
Edmonton	−32.7	+ 4.9	−50.0
Fort William	−12.2	+ 3.3	−23.8
Halifax	−14.9	+ 3.4	−19.8
Hamilton	− 4.1	− 2.0	+73.4
Kingston	−30.2	+10.7	−28.6
Kitchener	−12.6	+12.6	+75.0
London	−10.4	− 2.7	+18.7
Moncton	−23.3	−22.9	−21.4
Montreal	− 3.2	+ .3	− 3.0
Moose Jaw	−32.3	+ 7.3	−62.5
Ottawa	−11.2	− 1.0	−12.1
Outremont	+33.3	+33.9	+45.6
Quebec	− 6.7	+ .2	+15.9
Regina	−26.7	+ 1.5	+19.0
St. Catharines	−15.2	−22.0	+74.7
Saint John	− 6.2	+ 8.4	+70.9
Saskatoon	−38.0	−10.8	−63.9
Sault Ste. Marie	−10.4	− 6.6	+24.8
Toronto	− 7.5	− 9.6	+40.7
Vancouver	− 4.3	+ .2	+ 1.3
Verdun	+29.7	− 1.6	+27.0
Victoria	−28.4	+10.1	−19.2
Windsor	− 2.3	− 6.9	+22.0
Winnipeg	− 7.7	+ 8.5	−17.8

Actually in all but two instances, the resident death rate for cities of 20,000 population and over was substantially lower than that computed by place of occurrence. For infant

mortality, in ten of the cities the corrected rate was lower and in the remainder higher, than the recorded rate. In the case of tuberculosis mortality, the changes were most striking, resulting in a change of over 20 per cent for 16 of the 25 cities.

Following this special work, the Dominion Bureau has undertaken routine reallocation of all births and deaths by place of residence. The definitions and rulings to be followed in this work were drawn up by the Dominion Bureau of Statistics. These have met with the approval of the Committee and will be issued shortly by the Bureau in printed form for use throughout the Dominion.

The first two of the original recommendations have now been effectively implemented and it remains to carry out the third—namely, to encourage the various provinces (1) to undertake a system of mutual interchange of copies of certificates of births and deaths of non-residents, and (2) to establish a system for the transfer of copies of such certificates within each province. This concerns primarily the municipalities with organized health departments. A definite system of interchange within a province is necessary because it is not possible for the Dominion Bureau to issue their reports in time for them to be of value to local departments.

By a suitable system, the provincial department in charge of vital statistics could in each instance give those local departments which desire it a monthly statement of births and deaths of residents occurring elsewhere in the province and supply them with copies of the reports. In practice it has been found that this does not require a great deal of additional work since only a few municipalities in each province are in a position to handle such data. But for these, this information is of great practical importance and value.

In order to secure an expression of opinion on the feasibility of the minimum requirements for early reallocation as seen by this Committee, the following two questions were submitted for reply and comment, along with the above memorandum:

(1) Would the provincial department be willing to co-operate with other provinces in a scheme for the interchange of copies of birth and death certificates of non-residents occurring in the province?

(2) Would it be possible for the department to forward, at monthly intervals, to those municipal vital statistics departments which so desire, copies of birth and death certificates of their residents occurring elsewhere in the province?

In this way an effective administrative system for securing re-allocation as early as is possible could be attained. Virtually this is the system which has been employed in England and Wales for many years with great success. Interchange of copies of certificates is now also being effected among American States.

DISCUSSION

Replies from six provinces have been received and in each instance it was indicated that the department is willing and anxious to co-operate as suggested, and that the two procedures suggested by the Committee can be handled without difficulty. Considerable interest and enthusiasm was expressed by the various heads of departments and in several instances some degree of mutual interchange and municipal-provincial co-operation has already been achieved in making re-allocation possible, particularly in the case of departments of vital statistics in larger cities. The unanimity of these replies suggests that the introduction of a uniform scheme for re-allocation of

births and deaths early, through intra- and inter-provincial co-operation as outlined by the Committee, is immediately feasible.

The Committee strongly urges that since the scheme outlined in the above memorandum is simple and practicable, and since some provinces have already provided effectively such machinery as is required to effect re-allocation, that provincial departments of vital statistics undertake to initiate this mutual and co-operative system at an early date, so that the plan may be in full operation by the beginning of 1937.

Further, the Committee strongly urges that all reallocation in Canada be undertaken according to the tentative rules and definitions of the Dominion Bureau of Statistics, and approved by this Committee.

T. E. ASHTON, *Chairman*; GRANT FLEMING, W. R TRACEY, D. V. CURREY, AND PAUL PARROT.

REPORT OF THE STUDY COMMITTEE OF THE PUBLIC HEALTH NURSING SECTION

IN the chairman's address at the tenth annual meeting of the Public Health Nursing Section held in Montreal, June 12, 1934, the suggestion was made that a small study committee be appointed, to act with the officers of the Section and possibly with representation from the General Executive of the Association, to which questions might be referred either from other sections of the Association or from our own—questions about which it was felt useful information might be secured, such as administrative procedure, types of local organizations and their set-up, standards and qualifications of personnel, records, and registration. A resolution was forwarded from this meeting that a committee be appointed to study such questions as might be referred to it.

At the 1935 meeting of the Public Health Nursing Section in Toronto it was voted that the executive of the Section appoint this committee. The membership of the committee appointed is as follows:

Active Group: Miss Laura Gamble, Toronto, chairman; Miss Elizabeth L. Smellie, Victorian Order of Nurses, Ottawa; Dr. L. A. Pequegnat, Toronto; Miss Alice Ahern, Metropolitan Life Insurance Company, Ottawa; Miss Muriel MacKay, Toronto; Miss Isabel McEwen, Toronto; Miss M. I. Walker, London, Ont.; and Miss E. L. Moore, Toronto.

Consultant Group: Miss Margaret MacKenzie, Halifax; Miss Mona Wilson, Charlottetown; Dr. Wm. Warwick, Fredericton; Miss H. Dykeman, Saint John; Dr. Alphonse Lessard, Quebec; Miss A. Martineau, Miss M. Mathewson and Dr. J. A. Baudouin, Montreal; Miss Mary McCuaig, Ottawa; Miss F. H. M. Emory, Toronto; Miss Elizabeth Russell and Miss Anna Wells, Winnipeg; Miss C. I. Stewart and Miss Ruby Simpson, Regina; Miss Kate Brighty and Dr. R. B. Jenkins, Edmonton; and Dr. G. F. Amyot, Miss Margaret Kerr, Miss Elizabeth Breeze and Dr. J. W. McIntosh, Vancouver.

While this committee was being organized, the officers of the Section sent

out a questionnaire to health workers throughout the Dominion asking for suggested topics to be studied. The replies received were tabulated. "Requirements for Employment" had first place, "Supervision" second, "Physical Examination before and during Employment" third, and "Staff Education" fourth place.

The first meeting of the study committee was held in Toronto, November 25, 1935. It was decided that the committee should confine their first study to the topic "Requirements for Employment" and, since it is so closely related, that "Physical Examination before and during Employment" be considered part of "Requirements for Employment". A letter of inquiry was drafted asking for information about what is the present practice in Canada with respect to the employment of public health nurses, this letter to be sent to official Departments of Health, non-official health organizations, commercial and industrial firms employing public health nursing personnel. A mailing list has been completed and the letters are going out.

This preliminary work of organizing the committee and of securing a mailing list has of necessity been slow and the committee regrets that at present there is nothing further to report. It is hoped that during the coming year progress may be accomplished and that there will be the continued interest of the Section and of the Association in the topics to be studied, so that this committee may have a definite contribution to make.

LAURA A. GAMBLE, *Chairman.*

REPORT OF THE COMMITTEE ON MILK CONTROL

FOLLOWING the survey of legislation and the provisions for the control of milk in the various provinces which was made by the Committee last year, particular study has been made of the situation in Ontario. Regulations are now being drafted by the province of Ontario which will be of interest to all concerned in milk control. The Laboratory Section, through its Committee on Standard Methods for the Examination of Milk, is dealing with the laboratory aspect. Mr. R. H. Murray, C.E., Director of the Division of Sanitation in the Provincial Department of Public Health, Regina, is conducting a survey in regard to the extent of pasteurization in Canada as reported by the medical officer of health of each municipality and is obtaining details of epidemics which have been traced to milk. It is the purpose of the Committee to supply technical information in regard to the distribution of safe milk in all its aspects.

A. E. BERRY, *Secretary.*

EPIDEMIOLOGY AND VITAL STATISTICS

ENDEMIC INDEX FOR DIPHTHERIA, SCARLET FEVER, WHOOPING COUGH, AND MEASLES IN THE PROVINCES OF CANADA, JULY 1935-JUNE 1936

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FOR the purpose of comparing the reported incidence of diphtheria, scarlet fever, whooping cough, and measles, in the various provinces, the JOURNAL has published at intervals in the past two years the monthly morbidity rates for each of these diseases and presented the endemic index in each instance. The rates as published here are for the year July, 1935, to June, 1936.

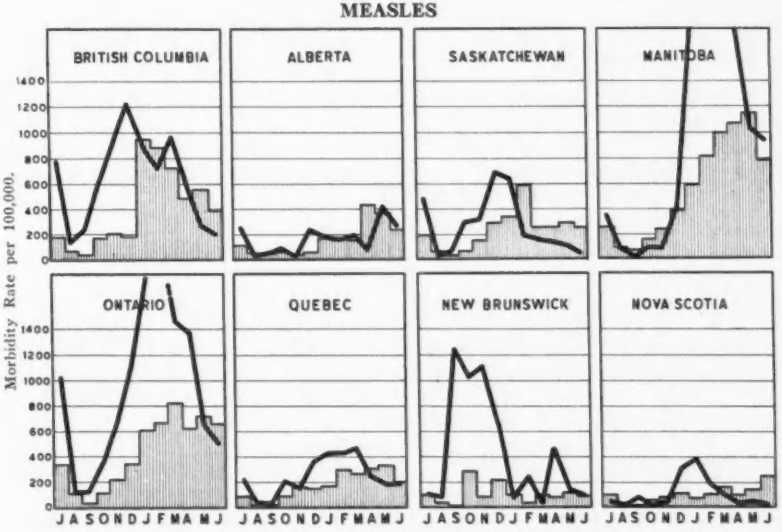

Figure I.—Monthly morbidity rates, July 1935 to June 1936, for eight provinces of Canada, with the endemic index. The morbidity rate is represented by the black line and the endemic index as shaded bars.
Manitoba—February, 2992; March, 3030. Ontario—February, 2160.

Measles—In 1935 82,928 cases of measles were reported in Canada, the greatest number reported in any year. The reporting of this disease is probably better but epidemic conditions prevailed in every province with the exception of Alberta in the year July, 1935 to June, 1936. The season of occurrence of these epidemics varied slightly in the different provinces but in the majority of the provinces the peak of the epidemic occurred in December, January or February. In New Brunswick the peak was in September and in Manitoba in March. The endemic index for measles is based on a ten-year average.

Diphtheria—The incidence of this disease has fallen steadily during the past five years. In the whole of Canada there were reported 5,879

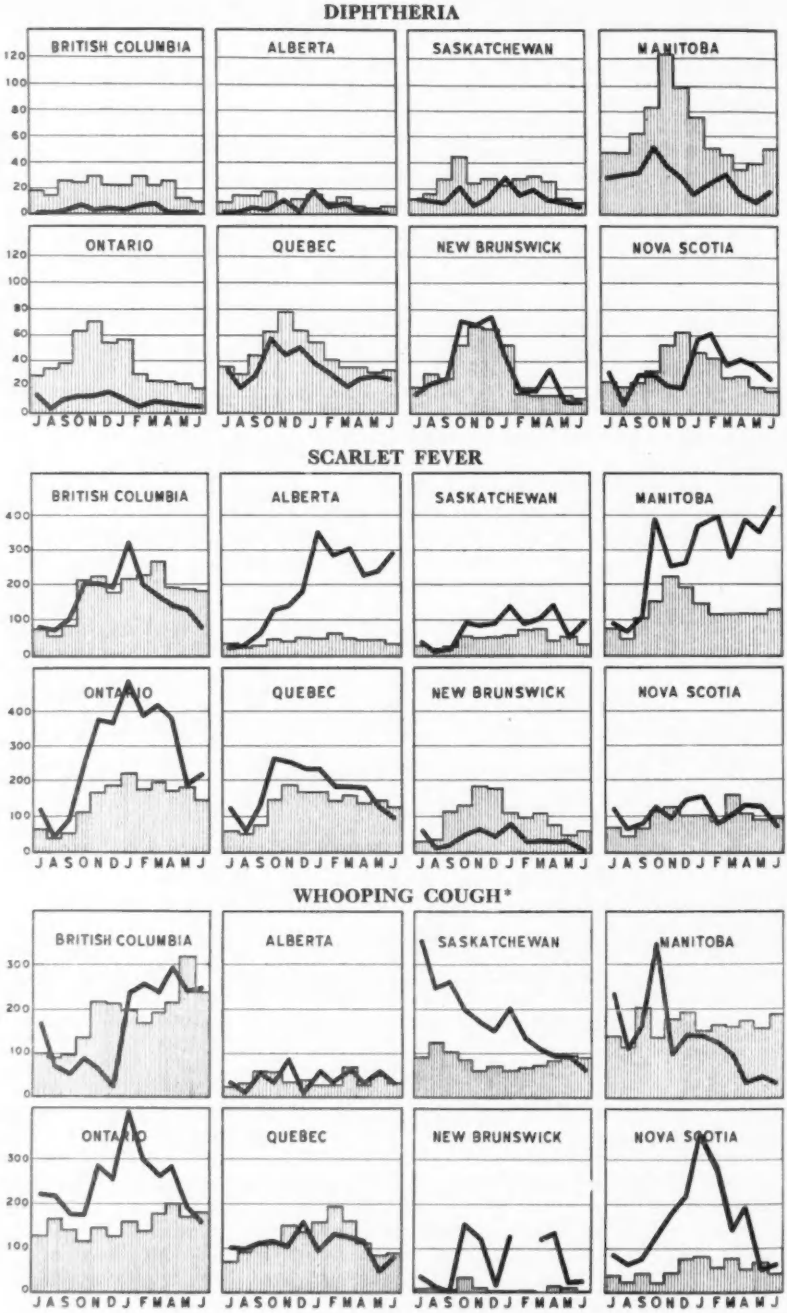

Figure II.—Monthly morbidity rates, July 1935 to June 1936, for eight provinces of Canada, with the endemic index. The morbidity rate is represented by the black line and the endemic index as shaded bars.

**The rate for whooping cough in New Brunswick was not plotted for February as delayed reports would have made it inaccurate.*

cases in 1931 and 1,995 in 1935, a reduction of 64 per cent. The decrease has varied in the different provinces and the endemic index has followed these variations. The five-year average on which the index is based includes the five years immediately prior to the year for which the morbidity rates are shown. During the year July, 1935, to June, 1936, the morbidity rate was below the endemic index in six of the eight provinces.

Scarlet Fever—The incidence for the whole of Canada has increased from 9,726 cases in 1932 to 17,681 cases in 1935. Part of this increase is probably due to better reporting. For the year shown on the charts, the morbidity rate is higher than the average in all the provinces except one.

Whooping Cough—There has been a steady increase in the number of cases reported since 1924. Part of this increase is definitely due to better reporting of this disease. The morbidity rate for the year ending June, 1936, was higher than the average for the past five years in practically every province.

The following table shows the number of cases reported from each of these diseases for the calendar years 1924 to 1935.

CASES REPORTED—CANADA*
1924-1935

Year	Population	Diphtheria		Scarlet Fever		Measles		Whooping Cough	
		Cases	Rate per 100,000	Cases	Rate per 100,000	Cases	Rate per 100,000	Cases	Rate per 100,000
1924.....	9,131,000	9,093	100	17,372	190	38,730	424	6,319	69
1925.....	9,282,000	7,383	80	14,379	155	23,510	253	8,063	87
1926.....	9,439,000	7,220	77	14,306	152	42,232	448	8,038	85
1927.....	9,624,000	8,514	88	15,509	161	28,426	296	6,986	72
1928.....	9,822,000	8,755	89	14,552	148	27,733	282	6,688	68
1929.....	10,016,000	8,829	88	15,851	158	42,140	421	10,461	104
1930.....	10,195,000	7,481	73	16,982	166	21,307	209	11,680	114
1931.....	10,362,833	5,879	57	12,798	123	25,639	248	9,151	88
1932.....	10,492,000	3,902	37	9,726	93	51,716	494	11,710	112
1933.....	10,667,000	2,445	23	10,161	95	13,669	128	14,622	137
1934.....	10,821,000	2,286	21	16,416	152	30,279	280	19,423	179
1935.....	10,935,000	1,995	18	17,681	162	82,928	758	18,164	166

*Except Prince Edward Island.

It should be recognized, of course, that the proportion of cases reported in each of these diseases varies greatly in the different provinces. Any comparison of the incidence between provinces must be made only with due consideration of this fact.

Diphtheria and scarlet fever in each province are reported much more completely than are whooping cough and measles. Comparison, however, of the current incidence with the preceding experience in a province may be made, indicating in a general way whether the disease to which the data relate is above or below its average incidence.

PLANS, PROGRAMS, AND PROGRESS

Poliomyclitis in Manitoba

One hundred and thirty cases of poliomyelitis in Manitoba, including seventeen in the Winnipeg area, were reported to September 16th. The distribution of the cases has been chiefly in the south and west. The original focus of the epidemic was in the Boissevain area. Recognizing the importance of early diagnosis in the effective treatment of this disease, permitting of the early use of serum and proper care, free diagnosis and treatment were provided by the municipal councils of Boissevain and Morton on August 21st, on the advice of Dr. F. W. Jackson, Deputy Minister of Health and Public Welfare. Similar provision has been made by Oakland, Wawanesa, and Whitewater. Notices have been posted throughout these municipalities and telephone subscribers have been notified so that there is no reason for delay in seeking the advice of a physician if there is any fear that the illness may be infantile paralysis. Health officers have reported that the use of serum has substantially limited the paralysis and in a number of cases prevented it entirely. There have been several deaths recorded.

Trial was made early in August in the Boissevain district of the nasal spray which has been found in experimental work in monkeys to give evidence of preventing the development of the disease when the virus is placed in the nasal tract. The experimental work on which this is based has been published by Doctors Charles Armstrong and W. T. Harrison of the National Institute of Health, Washington, in the U.S. Public Health Reports, vol. 51, no. 33, 1936. The spray contains 0.5 per cent picric acid and 0.5 per cent alum. This article suggested the trial of this spray into the nostrils three or four times on alternate days and thereafter weekly during the presence of the disease in the community. No appraisal of its possible value in preventing the disease in man has been made.

Health Insurance in British Columbia

Two members of a health commission responsible for the administration of health insurance have been named, Dr. Allon Peebles and Dr. W. T. Barrett. The Honourable Dr. G. M. Weir, Provincial Secretary, has announced that it is hoped that the insurance scheme will be in operation early in 1937. More than 80 per cent of the questionnaires sent to employers have been returned.

Diphtheria Immunization in Toronto

In the report of vital statistics for Toronto for the year 1935 which has just been published, a summary is presented of the number of children receiving diphtheria toxoid since 1926. A total of 128,054 children received the preventive treatment, of which 115,576 were treated in the schools or in the preschool clinics. During 1935 19,031 smallpox vaccinations were performed, 1,446 of these being made at the clinic in the city hall.

Diphtheria Immunization and Smallpox Vaccination in York Township, Ontario

Dr. C. A. Warren, D.P.H., Medical Officer of Health of York Township, adjoining Toronto and with a child population of 16,000, has reported nineteen consecutive months without a case of diphtheria. The immunization work is largely done in the schools by the health officer. Dr. Warren believes that practically all the children, both of preschool and school age, with the exception of children born last September, have received the toxoid treatment. Approximately 2,000 child-

ren of school and preschool age were vaccinated against smallpox in May of this year. The well-baby clinics held weekly in four districts of the township are well attended, as indicated by the attendance of 2,763 mothers during the past year. Assisting the part-time health officer are two municipal nurses.

Free Sanatoria Treatment for Tuberculosis Patients in Alberta

Provision for free sanatoria treatment for all persons suffering from tuberculosis has been made in Alberta. The value of this provision has been proved by the experience in Saskatchewan where free treatment for all cases was introduced in 1929.

Diphtheria Immunization in Windsor

The Windsor Board of Health is arranging to conduct another campaign this fall, including both preschool and school children. Preschool children will be given toxoid at a series of clinics on Saturday afternoons during October and November. No first doses will be given after the third clinic is held. Any school children who have not received toxoid will be given the treatment in the school which they attend. Parents are advised that if they are in a position to pay for this service they should take their children to the family physician. Prior to 1925 in the Windsor district from 200 to 800 cases of diphtheria were reported per 100,000 population. Preventive treatment was undertaken in 1925. In 1933 there were eight cases, in 1934 six cases, in 1935 fourteen cases and during 1936 to date two cases.

Examination of Preschool Children in Calgary

In May, 1935, when the school health service amalgamated with the city health department, a campaign for the physical examination of children three years old and under was initiated under the direction of Dr. Geraldine Oakley, Director of Child Welfare. Approximately 460 children were examined last year. Letters are sent to the parents and the aim is that every three-year-old child shall be physically examined before the age of four either by their physician or by the department.

Safety Instruction in the Schools of Quebec

Instructions have been issued to all school teachers in Quebec to give safety instruction as a part of the regular curriculum. A course of forty lessons has been prepared and it is planned that five minutes will be utilized each week.

Saskatchewan Health Service Board

The appointment of a Health Service Board to study the question of health insurance and state medicine has been announced by the Hon. J. M. Uhrich, Minister of Health. The members are Dr. R. O. Davison, Deputy Minister of Public Health, Regina; Dr. V. Black, Moose Jaw; and R. W. Hanham, Woodrow.

Rocky Mountain Spotted Fever

Two cases of Rocky Mountain spotted fever were reported at Hedley in British Columbia in August. These are probably the first cases to be definitely reported in Canada although cases are frequent in the north-western section of the United States. The disease is transmitted through the bite of the tick Dermacentor andersoni.

Clinics for School Children in Montreal

Provision has again been made by the Department of Health, Montreal, to provide a series of clinics where all children who have attained school age may be examined free, vaccinated against smallpox, and protected against diphtheria before entering school. Anti-smallpox vaccination is required of all children who are admitted to schools.

BOOKS AND REPORTS

Length of Life. *Louis I. Dublin, Ph.D., and Alfred J. Lotka, D.Sc., Metropolitan Life Insurance Company. The Ronald Press Company, 15 East 26th Street, New York City, 1936. 400 pages, 121 tables and charts. $5.00.*

The long and varied practical experience of the authors in the field of medical statistics has fitted both unusually well for the production of this excellent treatise on the rather technical subject of longevity. The systematic and complete nature of the text marks it as probably the outstanding work of its kind. Of particular value to readers with limited medical background is the terse exposition of some of the more lecturical phrases of the subject. In addition, some of the practical uses of life table data in the study of social and economic phenomena, as well as longevity, are indicated.

Several chapters, too, are devoted to some of the essential phases of medicine and public health which have an intimate bearing upon the subject of longevity. These chapters, dealing, for instance, with the contribution of medicine and sanitary science to human longevity and the relation of physical conditions to longevity, have a special appeal to those who are actively interested in preventive medicine and public health.

In the appendix to this book there is collected perhaps the most complete set of life tables available in any one volume. This feature and the last chapter, in which detailed information on methods of life table construction is given, will be of special interest to actuaries and to medical statisticians.

"Length of Life" presents in scholarly fashion the results of an intensive study of a subject which is of intimate human interest and wide appeal. The authors and their collaborators are to be heartily congratulated.

A. H. Sellers

Child Psychiatry. *Leo Kanner, M.D., Associate Professor of Psychiatry, the Johns Hopkins University, Baltimore. Charles C. Thomas, 220 East Monroe St., Springfield, Ill., 1936. 527 pages. $6.00.*

In many ways the progress of psychiatry bears a superficial resemblance to the investigation of an epidemic of an infectious disease. Our investigation of the origin of mental disorder, however, has led, not to an infected person acting as a source, but to the manner in which we have learned to meet our difficulties as children.

For this reason, the attention of farsighted psychiatrists in the past few years has centred on the child and his difficulties. This book is a result of an attack on children's problems by a psychiatrist trained in the methods of Adolf Meyer, one of America's leading psychiatrists.

In the first part of the volume the author deals with the basic principles of child study—the means of examination, diagnosis and treatment. In the second part, he discusses each disturbance separately. He considers first the changes of personality often associated with a severe systemic infection, and then gives a thorough consideration of the disturbances in behaviour considered to be entirely dependent on disruption in mental life, such as thumb sucking, sleep walking, masturbation, etc.

One might offer criticism on the ground that many of the discussions are very lengthy. In addition, many words are used which were coined by Adolf Meyer and which are not in common use in psychiatry or general medicine. This jargon tends to camouflage the useful knowledge contained. The book contains a wealth of information on a subject that is of vital importance to all persons interested in human welfare.

G. E. Hobbs